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In reply, please refer to:
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NPDES PERMIT NO. HI 0000329

**FACT SHEET: APPLICATION FOR RENEWAL OF NATIONAL POLLUTANT
DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND ZONE
OF MIXING (ZOM) TO DISCHARGE TO THE PACIFIC OCEAN
WATERS OF THE UNITED STATES**

PERMITTEE: CHEVRON PRODUCTS COMPANY

FACILITY: HAWAII REFINERY

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This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of the draft permit.

A. Permit Information

The following table summarizes administrative information related to the Chevron Product Company Hawaii Refinery (hereinafter facility).

Table F-1. Facility Information

Permittee	Chevron Products Company
Name of Facility	Hawaii Refinery
Facility Address	91-480 Malakole St. Kapolei, HI 96707
Facility Contact, Title, and Phone	Alan Davis, Refinery Manager, (808) 682-5711
Authorized Person to Sign and Submit Reports	Alan Davis, Refinery Manager, (808) 682-5711
Mailing Address	91-480 Malakole St. Kapolei, HI 96707
Billing Address	Same as above
Type of Facility	Petroleum Refinery (SIC 2911)
Pretreatment Program	NA
Reclamation Requirements	NA
Receiving Waters	Pacific Ocean
Receiving Water Type	Marine
Receiving Water Classification	Class A Dry Open Coastal Waters (HAR, Section 11-54-06(b)(2)(B))

1. NPDES Permit No. HI 0000329, including ZOM, became effective on August 30, 2006, and expired on January 31, 2011. The Permittee reapplied for an NPDES permit and ZOM on July 30, 2010. The Hawaii Department of Health (hereinafter DOH) administratively extended the NPDES permit, including the ZOM, on February 3, 2011, pending the reapplication processing.

The DOH reviewed the NPDES and ZOM applications and prepared a draft permit and fact sheet dated April 5, 2012. Chevron submitted comments on the draft permit by letter dated April 27, 2012. The Permittee published a Notice of Proposed Water Pollution Control Permit in the Honolulu Star-Advertiser on July 5, 2012, regarding the DOH proposal to issue the proposed public notice permit of July 5, 2012. Ms. Lisa Woods Munger of Goodsill, Anderson, Quinn, and Stifel submitted comments, on behalf of Chevron Products Company, on the proposed public notice permit by letter dated August 3, 2012. The DOH reviewed the Chevron comments of August 3, 2012, and prepared a revised proposed permit for re-public notification regarding the DOH proposed action to issue a NPDES permit for the facility. A second public notice was published on

September 30, 2013 in the Honolulu Star-Advertiser and DOH received comments from the EPA and Ms. Kris Battleson of Chevron. The DOH subsequently prepared the final permit incorporating some of the comments received and a Response to Comments document addressing all comments received.

2. The Director of Health (hereinafter Director) proposes to issue a permit to discharge to the waters of the State until **June 24, 2019**, and has included in the proposed permit those terms and conditions which are necessary to carry out the provisions of the Federal Water Pollution Control Act (P.L. 92-500), Federal Clean Water Act (CWA) (P.L. 95-217) and Chapter 342D, Hawaii Revised Statutes.

B. Facility Setting

1. Facility Operation and Location

Chevron Products Company (hereinafter Permittee) operates the facility, a petroleum refinery. The facility refines crude oil into commercially usable products. The facility has an average daily production crude throughput of 54,510 barrels per day (bbl/day). Crude oil is delivered by ship and pumped into eight crude tanks prior to being refined into commercially usable products. Crude oil is converted into liquefied petroleum gas (LPG), jet fuel, diesel, fuel oil, and asphalt. A sulfuric acid plant (owned and operated by the Permittee) is also located on site. The Permittee is permitted to discharge once-through non-contact brine well cooling water, treated process wastewater, and treated contaminated storm water runoff from Outfall Serial No. 001; once-through non-contact brine well cooling water (for the LPG unit) from Outfall Serial No. 002; and non-contact storm water from the refinery's non-process areas from Outfall Serial Nos. 003 and 004.

Cooling water blowdown, steam generator blowdown, sour water process streams, dimersol plant effluent, discharges from the weak and strong acid sumps (sulfuric acid plant), oily waste from vacuum trucks and port-a-feeds, oily process water, crude water draw from Tank-113, desalter effluent, and storm water from process areas is treated prior to discharge through Outfall Serial No. 001. A pH meter monitors the acid plant cooling water brine. In the event of elevated pH readings an automatic shutoff valve will stop flow to the outfall. Preliminary treatment includes:

- Oxidation for sour water process streams (prior to commingling with Dimersol plant effluent);
- Neutralization tanks for weak and strong acid sumps;
- American Petroleum Institute (API) separator for various oily wastes

generated on site (i.e., vacuum trucks and port-a-feeds, oily process water, crude water draw from Tank-113, desalter effluent, and storm water from process areas), followed by a benzene reduction unit (VOC stripper) and discharge to an aeration pond.

All process wastewater streams are then directed to a final treatment process prior to discharge from Outfall Serial No. 001. The final treatment processes consists of three unlined oxidation ponds in series (Oxidation Pond Nos. 1, 2, and 3), an unlined impoundment basin, an unlined post aeration basin, and an induced air floatation (IAF) unit. Oxidation Ponds 2 and 3 are effectively a single oxidation pond and are not separated.

The original purpose of the post aeration basin was to aerate the water prior to the IAF, however the aerator has been removed from the post aeration basin. The post aeration basin is currently being used to limit sludge from settling near the IAF feed pump suction pipes.

The IAF unit, which draws effluent from the post aeration basin for algae removal, is routed to the outfall sump (S-2). Effluent from the IAF can also be directed back into the impoundment basin. On May 7, 2011 screens were added to the IAF to reduce TSS concentrations in the effluent. The Permittee estimates that the screens result in an additional 3 to 5 percent TSS removal rate.

Ground water is extracted on site and used as once-through non-contact cooling water for the LPG unit prior to discharge through Outfall Serial No. 002. No treatment is provided.

Non-contact storm water is discharged from Outfall Serial Nos. 003 and 004. The portion of the facility which discharges to Outfall Serial No. 003 is used for storage of scrap equipment and metal for construction activities, such as painting, minor grinding and welding. Staging equipment such as pipes and planks for refinery maintenance activities are also stored in the area on pellets. A concrete pad is also located in this drainage area for the satellite accumulation of various wastes.

The portion of the Facility which discharges to Outfall Serial No. 004 includes roadways around the effluent treatment ponds and a closed refinery Land Treatment Facility.

Outfall Serial Nos. 001, 002, 003, and 004 discharge to the Pacific Ocean at the following locations:

Table F-2. Outfall Locations

Outfall Serial No.	Effluent Description	Outfall Latitude	Outfall Longitude
001	Once-through non-contact brine well cooling water, treated process wastewater, and treated contaminated storm water runoff	21°18'16.71"N	158°07'01.94"W
002	Once-through non-contact brine well cooling water (for the LPG unit)	21°18'44.79"N	158°07'05.48"W
003	Non-contact storm water	21°18'24.41"N	158°06'52.67"W
004	Non-contact storm water	21°18'20.88"N	158°06'50.90"W

Figure 1 of the draft permit provides a topographic map showing the location of the facility. Figure 2 of the draft permit provides a ZOM map and receiving water monitoring stations. Figure 3 of the draft permit provides a site drawing, including outfalls. Figure 4 of the draft permit provides a process flow diagram for the facility. Figure 5 of the draft permit provides a schematic of the water flow through the facility, including Outfall Serial Nos. 001 through 004.

2. Receiving Water Classification

The Pacific Ocean is designated as “Class A Dry Open Coastal Waters” under Section 11-54-06(b)(2)(B), Hawaii Administrative Rules (HAR). Protected beneficial uses of Class A waters include recreation, aesthetic enjoyment, and the protection and propagation of fish, shellfish, and wildlife.

3. Ocean Discharge Criteria

The Director has considered the Ocean Discharge Criteria, established pursuant to Section 403(c) of the CWA for the discharge of pollutants into the territorial sea, the waters of the contiguous zone, or the oceans. The United States Environmental Protection Agency (EPA) has promulgated regulations for Ocean Discharge Criteria in 40 Code of Federal Regulations (CFR) Part 125, Subpart M. The Director has determined that the discharge will not cause unreasonable degradation to the marine environment. Based on current information, the Director proposes to issue a permit.

4. Impaired Water Bodies on CWA 303(d) List

CWA section 303(d) requires states to identify specific water bodies where water quality standards (WQS) are not expected to be met after implementation of technology-based effluent limitations on point sources.

On September 20, 2013, the EPA approved the 2012 State of Hawaii Water Quality Monitoring and Assessment Report, which includes the 2012 303(d) List of Impaired Water Bodies in the State of Hawaii.

The location of the Outfall Serial No. 001 in the Pacific Ocean is not listed as impaired water body on the 2012 303(d) list. At present, no TMDLs have been established for this waterbody.

5. Summary of Existing Effluent and Storm Water Requirements

a. Existing Effluent Limitations and Monitoring Data

Effluent limitations contained in the existing permit for discharges from Outfall Serial Nos. 001 and 002 and representative monitoring data from December 2006 through December 2013 are presented in the following tables.

Table F-3. Historic Effluent Limitations and Monitoring Data – Outfall Serial No. 001

Parameter	Units	Effluent Limitation		Maximum Reported Data ¹	
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Flow	MGD	²	²	3.93	4.54
Biochemical Oxygen Demand (BOD ₅)	mg/L	³	³	16.5	51.8
	lbs/day	284	511	323	1,005
Hexavalent Chromium	lbs/day	0.14	0.29	0.066	0.066
Total Chromium	lbs/day	1.72	4.36	0.12	0.12
Ammonia Nitrogen	mg/L	³	³	3.0	5.03
	lbs/day	155	341	70	114
Oil and Grease	mg/L	⁴	⁴	---	---
	lbs/day	83	155	32	99
Phenols	lbs/day	1.27	3.82	0.53	1.54
Total Sulfide	mg/L	⁴	⁴	---	---
	lbs/day	1.5	3.36	1.5	1.5
Total Suspended Solids (TSS)	mg/L	³	³	13.1	45.2
	lbs/day	155	341	283	1,040
Total Organic Carbon (TOC)	mg/L	³	³	27	103
	lbs/day	624	1,124	491	1,858
pH	pH Units	Not less than 6.0 standard units or greater than 9.0 standard units ⁵		5.73 – 8.9	
Whole Effluent Toxicity	Chronic NOEC ≤ 42.0 TU _c or Acute LC ₅₀ ≥ 71.4 % (acute toxicity testing applicable only up to three years after the effective date of this permit)			168 TU _c	
Total Nitrogen	µg/L	NA	²	--	6,697
Nitrate + Nitrite Nitrogen	µg/L	NA	²	--	5,889

Parameter	Units	Effluent Limitation		Maximum Reported Data ¹	
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Total Phosphorus	µg/L	NA	²	--	165
Silica	µg/L	NA	²	--	12,580

NA = Not Applicable

¹ Source: DMRs submitted by the Permittee from December 2006 through June 2011.

² No effluent limitations for this pollutant in the previous permit, only monitoring required.

³ Compliance with effluent limitations for this pollutant in the previous permit are based on pollutant loading measured in pounds per day. The Permittee reported results in both pounds per day and micrograms per liter.

⁴ If the Permittee continuously measures the pH of the discharge, the Permittee shall maintain the pH within the pH effluent limitations specified above, except excursions from the range shall be permitted subject to the following limitations:

- a) The total time during which the pH values are outside the required range of pH values shall not exceed 7 hours and 26 minutes in any calendar month; and
- b) No individual excursion from the range of pH values shall exceed 60 minutes.

Table F-4. Historic Effluent Limitations and Monitoring Data – Outfall Serial No. 002

Parameter	Units	Effluent Limitation		Reported Data ¹	
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Flow	MGD	2	2	1.42	3.18
Temperature	°C	2	2	28	29
Total Organic Carbon	mg/L	5	5	1.3	2.8
pH	pH Units	Not less than 6.0 standard units or greater than 9.0 standard units		6.86 – 8.55	
Whole Effluent Toxicity	70% mean fertilization or 80% survival in 100% effluent			0% ³	
Total Nitrogen	µg/L	NA	2	--	1,027
Nitrate + Nitrite Nitrogen	µg/L	NA	2	--	297
Total Phosphorus	µg/L	NA	2	--	35
Silica	µg/L	NA	2	--	2,897

NA = Not Applicable

¹ Source: DMRs submitted by the Permittee from December 2006 through Dec 2013.

² No effluent limitations for this pollutant in the previous permit, only monitoring required.

³ Represents lowest percent fertilization.

b. Storm Water Runoff Monitoring

The previous permit required the Permittee to monitor storm water annually. The following storm water runoff data was taken from annual DMRs submitted by the Permittee from 2006 through 2010 at Outfall Serial Nos. 003 and 004.

Table F-5. Storm Water Runoff Monitoring Data – Outfall Serial No. 003

Parameter	Units	Storm Water Limitation	Maximum Reported Value ¹
Flow	Gallons/day	²	20,829
BOD ₅	mg/L	²	16.5
Chemical Oxygen Demand (COD)	mg/L	²	870
TSS	mg/L	²	401
Total Phosphorus	µg/L	²	216
Total Nitrogen	µg/L	²	5,420
Nitrate + Nitrite Nitrogen	µg/L	²	4,520
Oil and Grease	mg/L	15	13
pH	s.u.	7.6 – 8.6	7.89-10.4

¹ Source: Annual DMR's submitted by the Permittee for the years 2007 through 2013.

² No storm water limitations for this pollutant in the previous permit, only monitoring required.

Table F-6. Storm Water Runoff Monitoring Data – Outfall Serial No. 004

Parameter	Units	Storm Water Limitation	Maximum Reported Value ¹
Flow	Gallons/day	²	147,273
BOD ₅	mg/L	²	5.18
COD	mg/L	²	160
TSS	mg/L	²	1,290
Total Phosphorus	µg/L	²	267
Total Nitrogen	µg/L	²	2200
Nitrate + Nitrite Nitrogen	µg/L	²	2200
Oil and Grease	mg/L	15	2.5
pH	s.u.	7.6 – 8.6	8.14 - 9.0

¹ Source: Annual DMR's submitted by the Permittee for the years 2007 through 2013.

² No storm water limitations for this pollutant in the previous permit, only monitoring required.

6. Compliance Summary

a. Whole-Effluent Toxicity

(1) Outfall Serial No. 001. The following table lists toxicity limitation violations as identified in DMRs submitted by the Permittee from December 2006 to June 2011 at Outfall Serial No. 001.

Table F-7a. Summary of Compliance History

DMR Date	Maximum Reported Result (Effluent Limit: 42 TUC)	Number of Exceedances
November 2009	>168	1
May 2010	84	1
July 2010	84	1
October 2010	168	1
November 2010	84	1
December 2010	168	1
January 2011	168	1
February 2011	168	1
March 2011	84	1
April 2011	168	1
June 1, 2011	168	1
June 15, 2011	168	1
June 29, 2011	84	1

(2) Outfall Serial No. 002. The following table lists toxicity limitation violations as identified in DMRs submitted by the Permittee from December 2006 to August 2011 at Outfall Serial No. 002.

Table F-7b. Summary of Compliance History

DMR Date	Maximum Reported Result (Effluent Limit: Minimum of 80% Survival)	Number of Exceedances
June 2008	0	1
January 2009	72.5	1
October 2009	30.3	1
November 2009	76.6	1
February 2010	70.6	1
March 2010	60.4	1
April 2010	34.2	1
May 2010	14	1
June 2010	77	1
July 2010	4.5	1
August 2010	59	1
September 2010	35	1
October 2010	66	1
December 2010	76.2	1
January 2011	76.3	1
February 2011	68.7	1
August 2011	0.3	1

b. Effluent Limitation Exceedances

(1) Outfall Serial No. 001. The following table lists effluent limitation violations as identified in DMRs submitted by the Permittee from December 2006 to June 2011 at Outfall Serial No. 001.

Table F-7c. Summary of Compliance History

Date	Parameter	Units	Reported Result	Effluent Limitation	Number of Exceedances
February 21, 2007	pH	pH Units	5.73	6.0	1
February 20, 2008	TSS – Monthly	lbs/day	257	227	28
February 20, 2008	TSS – Daily	lbs/day	506	356	1
May 28, 2008	BOD – Monthly	lbs/day	323	284	31
May 28, 2008	BOD – Daily	lbs/day	1,005	511	1
June 10, 2008	TSS - Daily	lbs/day	458	356	1
February 4, 2009	TSS – Daily	lbs/day	538.7	356	1
April 8, 2009	TSS – Daily	lbs/day	643.8	356	1
April 9, 2009	TSS – Daily	lbs/day	528.0	356	1
April 10, 2009	TSS – Daily	lbs/day	604.0	356	1
May 26, 2010	TSS – Daily	lbs/day	409.5	356	1
June 2, 2010	TSS – Daily	lbs/day	469.0	356	1
September 15, 2010	TSS – Daily	lbs/day	476.0	356	1
December 22, 2010	TSS – Daily	lbs/day	497.8	356	1
December 22, 2010	TOC – Daily	lbs/day	1,857.1	1,124	1
December 22, 2010	BOD – Daily	lbs/day	872.4	511	1
December 31, 2010	TSS – Monthly	lbs/day	251	227	31
December 29, 2010	TSS – Daily	lbs/day	424.4	356	1
April 20, 2011	TSS – Daily	lbs/day	922.3	356	1
April 30, 2011	TSS – Monthly	lbs/day	275.0	227	30
June 1, 2011	TSS – Daily	lbs/day	1,039.6	356	1
June 30, 2011	TSS – Monthly	lbs/day	282.7	22	31

(2) Outfall Serial No. 002. There were no additional exceedances from Outfall Serial No. 002, other than the whole effluent toxicity exceedances summarized in Table F-7b, during the term of the previous permit.

c. Storm Water Exceedances

(1) Outfall Serial No. 003. There were no exceedances from Outfall Serial No. 003 during the term of the previous permit.

(2) Outfall Serial No. 004. The following table lists effluent limitation violations as identified in DMRs submitted by the Permittee from December 2006 to June 2011 at Outfall Serial No. 004.

Table F-7d. Summary of Compliance History

Date	Parameter	Units	Reported Result	Effluent Limitation	Number of Exceedances
February 2007	pH	pH Units	8.84	8.6	1
December 2010	pH	pH Units	9.0	8.6	1

7. Planned Changes

There are no planned changes to the Facility.

C. Applicable Plans, Policies, and Regulations

1. Hawaii Administrative Rules, Chapter 11-54

On November 12, 1982, the Hawaii Administrative Rules, Title 11, Department of Health, Chapter 54 became effective (hereinafter HAR, Chapter 11-54). HAR, Chapter 11-54 was amended and compiled on October 6, 1984; April 14, 1988; January 18, 1990; October 29, 1992; April 17, 2000; October 2, 2004; June 15, 2009, October 21, 2012; and the most recent amendment was on December 6, 2013. HAR, Chapter 11-54 establishes beneficial uses and classifications of state waters, the state antidegradation policy, zones of mixing standards, and water quality criteria that are applicable to the Pacific Ocean.

On March 18, 2013, the DOH has received approval from EPA, in accordance with CWA Section 303(c) and implementing federal regulations at 40 CFR 131, to implement schedules of compliance for State-adopted water quality standards in NPDES permits. The following sections of Chapter 11-55 contains Hawaii's provisions to implement schedules of compliance: 11-55-01, 11-55-08(a)(2)(B), 11-55-15(d), 11-55-19(a)(4)(A), 11-55-21, and 11-55-22. These compliance schedule implementation provisions adopted by the State in Chapter 11-55 on October 21, 2012, were found by EPA to be consistent with the requirements of the CWA and EPA's regulations at 40 CFR 131.5 and 131.6. Accordingly, the DOH is authorized to incorporate schedules of compliance for water quality based effluent limits into NPDES permits.

Requirements of the draft permit implement HAR, Chapter 11-54.

2. Hawaii Administrative Rules, Chapter 11-55

On November 27, 1981 HAR, Title 11, Department of Health, Chapter 55 became effective (hereinafter HAR, Chapter 11-55). HAR Chapter 11-55 was amended

and compiled on October 29, 1992; September 22, 1997; January 6, 2001; November 7, 2002; August 1, 2005; October 22, 2007; June 15, 2009; October 21, 2012; AND December 6, 2013. HAR Chapter 11-55 establishes standard permit conditions and requirements for NPDES permits issued in Hawaii.

Requirements of the draft permit implement HAR, Chapter 11-55.

3. State Toxics Control Program

NPDES Regulations in 40 CFR 122.44(d) require permits to include water quality-based effluent limitations (WQBELs) for pollutants, including toxicity, that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an exceedance of a WQS. The *State Toxics Control Program: Derivation of Water Quality-Based Discharge Toxicity Limits for Biomonitoring and Specific Pollutants* (hereinafter, STCP) was finalized in April, 1989, and provides guidance for the development of water quality-based toxicity control in NPDES permits by developing the procedures for translating WQS in HAR, Chapter 11-54 into enforceable NPDES permit limits. The STCP identifies procedures for calculating permit limits for specific toxic pollutants for the protection of aquatic life and human health.

Guidance contained in the STCP was used to determine effluent limitations in the draft permit.

D. Rationale for Effluent Limitations and Discharge Specifications

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. NPDES regulations establish two principal bases for effluent limitations. In 40 CFR 122.44(a), permits are required to include applicable technology-based limitations and standards; and in 40 CFR 122.44(d), permits are required to include WQBELs to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. When numeric water quality objectives have not been established, but a discharge has the reasonable potential to cause or contribute to an excursion above a narrative criterion, WQBELs may be established using one or more of three methods described in 40 CFR 122.44(d) – 1) WQBELs may be established using a calculated water quality criterion derived from a proposed state criterion or an explicit state policy or regulation interpreting its narrative criterion; 2) WQBELs may be established on a case-by-case basis using EPA criteria guidance published under CWA Section 304 (a); or 3) WQBELs may be established using an indicator parameter for the pollutant of concern.

1. Technology-Based Effluent Limitations

a. Scope and Authority

CWA Section 301(b) and 40 CFR 122.44(a) require that permits include applicable technology-based limitations and standards. The CWA requires that technology-based effluent limitations be established based on best practicable treatment and control technology (BPT), best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and New Source Performance Standards (NSPS).

b. Applicable Technology-Based Effluent Limitations

EPA has established standards of performance (technology-based limitations and standards) for the petroleum refining industry in 40 CFR 419, *Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards for Petroleum Refining Point Source Category* (ELGs). More specifically, Subpart B of these regulations for the Cracking Subcategory applies to discharges from the facility and has been used to develop limitations and requirements in the draft permit.

ELGs in 40 CFR 419.20 contain effluent limitations based on BPT, BAT, BCT, and NSPS. The facility began operating in 1960, thus is not considered a new source, as defined in 40 CFR 122.2, since it was constructed before the NSPS on October 18, 1982. Therefore, the draft permit includes effluent limitations based on BPT and BAT.

The draft permit establishes the following technology-based effluent limitations at the specified discharge locations.

(1) Technology-Based Effluent Limitations – Outfall Serial No. 001

(a) Process Wastewater Mass-Based Effluent Limitations

40 CFR 419 Subpart B requires that technology-based effluent limitations for Outfall Serial No. 001 be derived based on refinery production (the total crude oil throughput of the facility) and the treatment processes used. The technology-based effluent limitations established at Outfall Serial No. 001 are based on the average daily production crude oil throughput of 54,510 bbl/day and associated production feed rates, as reported in the NPDES Application for permit renewal. Technology-based effluent limitations in future permits may be

revised based on increased production rates at the facility as long as the final effluent limitations are consistent with State and federal anti-backsliding and anti-degradation requirements.

Derivation of the production-based effluent limitations based on 40 CFR 419 Subpart B is presented in detail in Appendix 1 to this Fact Sheet. Table F-8, below, summarizes the applicable technology-based effluent limitations for Outfall Serial No. 001.

Table F-8. Applicable Technology-Based Effluent Limitations

Pollutant	Units	Effluent Limitations ¹	
		Average Monthly	Maximum Daily
BOD ₅	lbs/day	274	494
TSS	lbs/day	220	344
COD ²	lbs/day	603	1,087
Oil & Grease	lbs/day	80	150
Phenols	lbs/day	1.3 ³	3.7
Ammonia Nitrogen	lbs/day	150 ³	329 ³
Sulfide	lbs/day	1.4 ³	3.2 ³
Total Chromium	lbs/day	1.5 ³	4.4 ³
Hexavalent Chromium	lbs/day	0.12 ³	0.28 ³
pH	pH Units	6.0 – 9.0	

¹ All technology-based limitations for process wastewaters are based on BPT unless otherwise noted.

² In any case in which the Permittee can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD₅. If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable limitations of BOD₅.

³ Based on BAT.

The previous permit established effluent limitations for the average monthly effluent limitation for phenol and a more stringent daily maximum effluent limitation for total chromium. The more stringent effluent limitations for these pollutants are being retained in the draft permit.

Effluent limitations for TOC are included in the draft permit in lieu of chemical oxygen demand (COD). As specified in 40 CFR 419, if the Permittee can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/L, the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD₅. If

in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable limitations of BOD₅. The previous permit included a TOC effluent in lieu of COD, with the limit being calculated based on a 2.2 to 1 ratio with BOD₅. The draft permit retains this effluent limitation.

ELGs at 40 CFR 419.22(d), 419.23(e), and 419.24(d) state that the quality and quantity of pollutants or pollutant properties attributable to once-through cooling water are excluded from the discharge allowed by facility production rates specified in Appendix 1, Table 1, of this Fact Sheet. Therefore, compliance with final technology-based effluent limitations for process water discharged from Outfall Serial No. 001 summarized in Table F-9 is applicable after treatment and prior to commingling with once-through non-contact brine well cooling water.

Table F-9. Final Process Wastewater Technology-Based Effluent Limitations

Pollutant	Units	Effluent Limitations	
		Average Monthly	Maximum Daily
BOD ₅	lbs/day	274	494
TSS	lbs/day	220	344
TOC	lbs/day	603	1,087
Oil & Grease	lbs/day	80	150
Phenols	lbs/day	1.27	3.7
Ammonia Nitrogen	lbs/day	150	329
Sulfide	lbs/day	1.4	3.2
Total Chromium	lbs/day	1.5	4.36
Hexavalent Chromium	lbs/day	0.12	0.28
pH	pH Units	6.0 – 9.0	

(b) Once-Through Non-Contact Brine Well Cooling Water Limitations

ELGs at 40 CFR 419.22(d) and 419.23(e) state that once-through cooling water may be discharged with a TOC concentration not to exceed 5 mg/L. The draft permit establishes a daily maximum and monthly average effluent limitation of 5 mg/L for once-through cooling water discharged from Outfall Serial No. 001, with compliance measured prior to commingling with treated process water effluent.

(2) Technology-Based Effluent Limitations – Outfall Serial No. 002

Outfall Serial No. 002 discharges once-through non-contact cooling water for the LPG unit. Federal regulations at 40 CFR 419.22(d) and 419.23(e) establish effluent limitations for once-through cooling water. The

regulations state that once-through cooling water may be discharged with a TOC concentration not to exceed 5.0 mg/L. The draft permit establishes a maximum daily effluent limitation and average monthly effluent limitation for TOC of 5 mg/L. Since this is at least as stringent as the previous permit, State and federal anti-backsliding requirements have been met.

(3) Discharge Limitation Allocations for Treated Contaminated Runoff

Additional effluent limitation allocations for contaminated runoff commingled with process wastewater are developed from requirements in 40 CFR 419.22(e)(2), 419.23(f)(2), and 40 CFR 419.24(e)(2). These allocations are in addition to the process wastewater mass-based limitations. A full description of the additional effluent limitation allocations can be found in Appendix 1 of this Fact Sheet. The draft permit establishes these effluent limitation allocations at Outfall Serial No. 001. The discharge limitation allocation for TOC is based on a ratio of 2.2 to 1 to the limitations for BOD₅. These discharge limitation allocations are retained from the previous permit and are in compliance with petroleum refining ELGs.

2. Water Quality-Based Effluent Limitations (WQBELs)

a. Scope and Authority

NPDES Regulations at 40 CFR 122.44(d) require permits to include WQBELs for pollutants, including toxicity, that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard (reasonable potential). As specified in 40 CFR 122.44(d)(1)(i), permits are required to include WQBELs for all pollutants “which the Director determines are or may be discharged at a level that will cause, have reasonable potential to cause, or contribute to an excursion above any state water quality standard.”

The process for determining reasonable potential and calculating WQBELs, when necessary, is intended to protect the receiving waters as specified in HAR, Chapter 11-54. When WQBELs are necessary to protect the receiving waters, the DOH has followed the requirements of HAR, Chapter 11-54, the STCP, and other applicable state and federal guidance policies to determine WQBELs in the draft permit.

Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be

established in accordance with the requirements of 40 CFR 122.44(d)(1)(vi), using (1) EPA criteria guidance under CWA Section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information.

b. Applicable Water Quality Standards

The beneficial uses and WQS that apply to the receiving waters for this discharge are from HAR, Chapter 11-54.

(1) HAR, Chapter 11-54. HAR, Chapter 11-54 specifies numeric aquatic life standards for 72 toxic pollutants and fish consumption standards for 60 toxic pollutants, as well as narrative standards for toxicity. Effluent limitations and provisions in the draft permit are based on available information to implement these standards.

(2) Water Quality Standards. The facility discharges to the Pacific Ocean, which is classified as Class A Dry Open Coastal Waters in HAR, Chapter 11-54. As specified in HAR, Chapter 11-54, saltwater standards apply when the dissolved inorganic ion concentration is above 0.5 parts per thousand. As such, a reasonable potential analysis was conducted using saltwater standards. Additionally, fish consumption WQS were also used in the RPA to protect human health. Where both saltwater standards and fish consumption standards are available for a particular pollutant, the more stringent of the two will be used in the RPA.

40 CFR 122.45(c) requires effluent limitations for metals to be expressed as total recoverable metal. Since WQS for metals are expressed in the dissolved form in HAR, Chapter 11-54, factors or translators must be used to convert metal concentrations from dissolved to total recoverable. Default EPA conversion factors were used to convert the applicable dissolved criteria to total recoverable.

(3) Receiving Water Hardness. HAR, Chapter 11-54 contains water quality criteria for six metals that vary as a function of hardness in freshwater. A lower hardness results in a lower freshwater water quality standard. The metals with hardness dependent standards include cadmium, copper, lead, nickel, silver, and zinc. Ambient hardness values are used to calculate freshwater WQS that are hardness dependent. Since saltwater standards are used for the RPA, the receiving water hardness was not taken into consideration when determining reasonable potential.

c. Determining the Need for WQBELs

NPDES regulations at 40 CFR 122.44(d) require effluent limitations to control all pollutants which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard. Assessing whether a pollutant has reasonable potential is the fundamental step in determining whether or not a WQBEL is required. Using the methods prescribed in EPA's *Technical Support Document for Water Quality-Based Toxics Control* (the TSD, EPA/505/2-90-001, 1991), the effluent data from Outfall Serial Nos. 001 and 002 were analyzed to determine if the discharge demonstrates reasonable potential. The Reasonable Potential Analysis (RPA) compared the effluent data with numeric and narrative WQS in HAR, Chapter 11-54-4. To determine reasonable potential for parameters contained in HAR, Chapter 11-54-6, a direct comparison of the effluent's maximum effluent concentration was compared to the most stringent WQS.

(1) Reasonable Potential Analysis (RPA). The RPA for pollutants with WQS specified in HAR, Chapter 11-54-4, based on the TSD, combines knowledge of effluent variability as estimated by a coefficient of variation with the uncertainty due to a limited number of data to project an estimated maximum receiving water concentration as a result of the effluent. The estimated receiving water concentration is calculated as the upper bound of the expected lognormal distribution of effluent concentrations at a high confidence level. The projected maximum receiving water concentration, after consideration of dilution, is then compared to the WQS in HAR, Chapter 11-54 to determine if the pollutant has reasonable potential. The projected maximum receiving water concentration has reasonable potential if it cannot be demonstrated with a high confidence level that the upper bound of the lognormal distribution of effluent concentrations is below the receiving water standards.

Because the most stringent WQS for pollutants specified in HAR, Chapter 11-54-6 are provided as geometric means and exceedances of these WQS are less sensitive to effluent variability, the RPA was conducted by doing a direct comparison of the maximum effluent concentration to the most stringent applicable WQS.

(2) Effluent Data. The RPA was based on available effluent monitoring data submitted to the DOH in DMRs over the current permit term and the NPDES Application Form 2C dated July 30, 2010, for permit reissuance for Outfall Serial Nos. 001 and 002.

(3) Dilution. The STCP defines dilution as the reduction in the concentration of a pollutant or discharge which results from mixing with the receiving waters, and discusses dilution for submerged and high-rate outfalls. The STCP states that minimum dilution is used for establishing effluent limitations based on chronic criteria and human health standards for non-carcinogens, and average conditions be used of establishing effluent limits based on human health standards for carcinogens. The previous permit included a dilution of 42:1 (seawater: effluent) provided at Outfall Serial No. 001 and does not establish a dilution at Outfall Serial Nos. 002, 003, or 004. The dilution at Outfall Serial No. 001 was calculated using the EPA model Plume using the applicable information regarding the characteristic of the discharge and outfall.

HAR, Section 11-54-9 allows the use of a ZOM to demonstrate compliance with WQS. ZOMs consider initial dilution, dispersion, and reactions from substances which may be considered to be pollutants. However, due to other potential sources of pollutants into the receiving water, such as storm water runoff or unidentified discharges, it is often problematic to determine the cause of WQS exceedances in the receiving water at the edge of a ZOM. It is more practical to determine the available dilution provided in the ZOM and apply that dilution to the WQS to calculate an effluent limitation that can be applied end-of-pipe. However, an available dilution at the edge of the ZOM is not currently known for this discharge. Thus, for Section 11-54-6(b)(3) parameters, reasonable potential to contribute to an exceedance of WQS is most reasonably assessed by comparing monitoring data at the edge of the ZOM to the applicable WQS. If an annual geometric mean at a monitoring station at the edge of a ZOM exceeds the applicable WQS, the Permittee is determined to have reasonable potential for the pollutant. If an exceedance of WQS is not observed at the edge of the ZOM, it is assumed that sufficient dilution and assimilative capacity exists to meet WQS at the edge of the ZOM. Where multiple samples are taken at various depths in the water column for the same monitoring station, the geometric mean for the entire water column was considered.

Where reasonable potential has been determined for HAR, Section 11-54-6(b)(3) pollutants, limitations must be established that are protective of water quality. Because the dilution at the edge of the ZOM is not known, where assimilative capacity exists this permit establishes limitations for Section 11-54-6(b)(3) pollutants as performance-based effluent limitations and receiving water limitations and requires the Permittee to conduct a dilution analysis at the edge of the ZOM so that

end-of-pipe effluent limitations may be established during future permitting efforts. Where assimilative capacity does not exist, it is not appropriate to grant a ZOM and/or dilution, and an end-of-pipe criteria-based effluent limitation must be established that is protective of WQS.

Assimilative capacity for pollutants with reasonable potential is evaluated for Section 11-54-6(b)(3) pollutants by aggregating all ZOM control station data annually and comparing the annual geometric means to the applicable WQS. If an annual geometric mean exceeds 90 percent of the WQS, assimilative capacity is determined to be insufficient and dilution may not be granted.

The Permittee's ZOM monitoring data indicates that the receiving water at control stations C8 and C9 do not have assimilative capacity for total nitrogen and ammonia nitrogen. Thus, dilution was not granted at Outfall Serial No. 001 for total nitrogen or ammonia nitrogen.

(4) Summary of RPA Results. The maximum effluent concentrations from the DMRs over the current permit term and the NPDES Application Form 2C, maximum projected receiving water concentration after dilution calculated using methods from the TSD, the applicable HAR, Section 11-54-4(b)(3) or 11-54-6 water quality standard, and result of the RPA for pollutants discharged from Outfall Serial Nos. 001 and 002 are presented in Tables F-10a and F10b, below. For HAR, Section 11-54-4(b)(3) pollutants at Outfall Serial No. 001 (which has been granted a ZOM), because the available dilution is not currently known, receiving water data at the edge of the ZOM was used to evaluate reasonable potential. Only pollutants detected in the discharge are presented in Tables F-10a and 10b. All other pollutants were not detected and therefore, no reasonable potential exists.

Table F-10a. Summary of RPA Results for Outfall Serial No. 001

Parameter	Units	Maximum Effluent Concentration	Maximum Projected Concentration	Applicable Water Quality Standard	RPA Results
Arsenic, Total Recoverable	µg/L	291	42.96	36	Yes
Mercury, Total Recoverable	µg/L	0.64	0.09	0.029 ¹	Yes
Nickel, Total Recoverable	µg/L	58.2	8.59	8.4 ¹	Yes
Zinc, Total Recoverable	µg/L	20	6.2	91	No
Phenols	µg/L	133 ²	7.3	170	No
Total Nitrogen	µg/L	109.76 ³	NA	110	No
Ammonia Nitrogen	µg/L	1.82 ³	NA	2.0	No
Nitrate + Nitrite Nitrogen	µg/L	2.85 ³	NA	3.5	No

Total Phosphorus	µg/L	15.3 ³	NA	16.0	No
Turbidity	NTU	0.17 ²	NA	0.20	No

¹ Applicable water quality standard calculated to account for water hardness.

² Acute criteria was used for phenol because chronic criteria does not exist.

³ Maximum annual geometric mean at the edge of the ZOM for 2009 through 2013.

Table F-10b. Summary of RPA Results for Outfall Serial No. 002

Parameter	Units	Maximum Effluent Concentration	Maximum Projected Concentration	Applicable Water Quality Standard	RPA Results
Total Nitrogen	µg/L	349	NA	110.0	Yes
Nitrate + Nitrite Nitrogen	µg/L	179	NA	3.5	Yes
Total Phosphorus	µg/L	35	NA	16.00	Yes

(5) Reasonable Potential Determination.

(a) Constituents with limited data. In some cases, reasonable potential cannot be determined because effluent data are limited. The draft permit requires the Permittee to continue to monitor for these constituents in the effluent using analytical methods that provide the lowest available detection limits. When additional data become available, further RPAs will be conducted to determine whether to add numeric effluent limitations to this draft permit or to continue monitoring.

Data for the following parameters was not available:

- Ammonia Nitrogen (002)
- 1,2,4,5- tetrachlorophenol
- 2,3,5,6-tetrachlorophenol
- aluminum
- chlorine
- chloropyrifos
- demeton
- 2,4-dichloroehenol
- 2,4-dinitro-o-cresol
- guthion
- isoprophylchloroether
- malathion
- metabolite TDE
- methoxychlor-
- methyl(bis)chloroether
- mirex
- nitrosamines
- nitroso-dibutylamine-N
- nitroso-diethylamine-N
- parathion
- pentachlorobenzene
- pentachloroethanes
- pyrrolidine-N
- tributyltin

(b) Pollutants with No Reasonable Potential. WQBELs are not included in this draft permit for constituents listed in HAR,

Chapter 11-54-4(3) that do not demonstrate reasonable potential; however, monitoring for such pollutants is still required in order to collect data for future RPAs. Pollutants with no reasonable potential consist of any pollutant not discussed in Parts D.2.c.(5).(a) or D.2.c.(5).(c) of this Fact Sheet.

(c) Pollutants with Reasonable Potential. At Outfall Serial No. 001 the RPA indicated that arsenic, mercury, and nickel have reasonable potential to cause, or contribute to an excursion above State WQS. Thus, WQBELs have been established in this draft permit at Outfall Serial No. 001 for arsenic, mercury, and nickel. The WQBELs were calculated based on WQS contained in HAR, Chapter 11-54 and procedures contained in both STCP and HAR, Chapter 11-54, as discussed in Part D.2.d, below.

At Outfall Serial No. 002 the RPA indicated that total nitrogen, nitrate + nitrite nitrogen, and total phosphorus have reasonable potential to cause, or contribute to an excursion above State WQS. Thus, WQBELs have been established in this draft permit at Outfall Serial No. 002 for total nitrogen, nitrate + nitrite nitrogen, and total phosphorus. The WQBELs were calculated based on WQS contained in HAR, Chapter 11-54 and procedures contained in both STCP and HAR, Chapter 11-54, as discussed in Part D.2.d, below.

d. WQBEL Calculations

Specific pollutant limits may be calculated for both the protection of aquatic life and human health.

(1) WQBELs based on Aquatic Life Standards. The STCP categorizes a discharge from a facility into one of four categories: (1) marine discharges through submerged outfalls; (2) discharges without submerged outfalls; (3) discharges to streams; or (4) high-rate discharges. Once a discharge has been categorized, effluent limitations for pollutants with reasonable potential can be calculated, as described below.

- (a)** For marine discharges through submerged outfalls, the daily maximum effluent limitation shall be the product of the chronic water quality standard and the minimum dilution factor;
- (b)** For discharges without submerged outfalls, the daily maximum effluent limitation shall be the acute toxicity standard. More stringent limits based on the chronic standards may be developed using Best Professional Judgment (BPJ);

(d) For discharges to streams, the effluent limitation shall be the most stringent of the acute standard and the product of the chronic standard and dilution; and

(d) For high rate outfalls, the maximum limit for a particular pollutant is equal to the product of the acute standard and the acute dilution factor determined according to Section II.B.4 of the STCP. More stringent limits based on chronic standards may be developed using BPJ.

(2) WQBELs based on Human Health Standards. The STCP specifies that the fish consumption standards are based upon the bioaccumulation of toxics in aquatic organisms followed by consumption by humans. Limits based on the fish consumption standards should be applied as 30-day averages for non-carcinogens and annual averages for carcinogens.

The discharge from Outfall Serial No. 001 is considered a marine discharge through a submerged outfall. Therefore, for pollutants with reasonable potential, the draft permit establishes, on a pollutant by pollutant basis, daily maximum effluent limitations based on the saltwater chronic aquatic life standard and average monthly effluent limitations for non-carcinogens or annual average effluent limitations for carcinogens based on the human health standard.

The discharge from Outfall Serial No. 002 is considered a marine discharge through an unsubmerged outfall. Therefore, for pollutants with reasonable potential, the draft permit establishes, on a pollutant by pollutant basis, daily maximum effluent limitations based on the saltwater acute aquatic life standard.

WQBELs established in the draft permit are discussed in detail below.

(3) Calculation of Pollutant-Specific WQBELs

The following equations were used to calculate reasonable potential for the pollutants below.

$$\text{Projected Maximum RWC} = \text{MEC} \times 95\%_{\text{ratio}} \times \text{Dm}$$

Where:

RWC	=	Receiving water concentration
MEC	=	maximum effluent concentration reported
95% _{ratio}	=	The 95% ratio from Table 3-1 in the TSD
Dm	=	Percent effluent at the edge of the mixing zone (i.e., 42:1, or 2.3% for Outfall Serial No. 001)

If the projected maximum receiving water concentration is greater than the applicable water quality standard from HAR, Chapter 11-54, the reasonable potential exists for the pollutant and effluent limitations are established. Pollutants with reasonable potential are discussed below in detail.

(a) Arsenic at Outfall Serial No. 001

- i. **Arsenic Water Quality Standards.** The most stringent applicable water quality standard for arsenic, expressed as dissolved arsenic, is the chronic aquatic life water quality standard of 36 µg/L, which converts to a total recoverable arsenic water quality standard of 36 µg/L, as specified in HAR, Chapter 11-54. There are no fish consumption standards for arsenic in HAR, Chapter 11-54.
- ii. **RPA Results.** Outfall Serial No. 001 had one data point for arsenic ($n = 1$), resulting in a $CV = 0.6$. Based on a CV of 0.6 and one sample, the 95% multiplier from Table 3.1 of the TSD was 6.2. As discussed in Part D.2.d.(3) of this fact sheet, the facility is granted a dilution of 42:1. Therefore, $Dm = 2.3\%$.

The maximum effluent concentration for arsenic was 291 µg/L.

$$\begin{aligned}\text{Projected Maximum RWC} &= \text{MEC} \times 95\%_{\text{ratio}} \times Dm \\ &= (291 \text{ µg/L}) \times 6.2 \times 0.023 \\ &= 42.96 \text{ µg/L}\end{aligned}$$

$$\text{HAR 11-54 Water Quality Standard} = 36 \text{ µg/L}$$

The projected maximum receiving water concentration (42.96 µg/L) exceeds the most stringent applicable water quality standard for this pollutant (36 µg/L), demonstrating reasonable potential. Therefore, the draft permit establishes effluent limitations for arsenic at Outfall Serial No. 001.

- iii. **Arsenic WQBELs.** WQBELs for arsenic calculated using STCP procedures, with a dilution credit of 42, are based on the chronic aquatic life water quality standard. The draft permit establishes a daily maximum effluent limitation for arsenic of 1,512 µg/L from Outfall Serial No. 001. There are no fish consumption standards for arsenic; therefore, there are no monthly average effluent limitations for arsenic included in the draft permit.
- iv. **Feasibility.** The maximum effluent concentration reported for arsenic from Outfall Serial No. 001 during the term of the previous permit was 291 µg/L. Since the maximum effluent concentration

is less than the proposed effluent limitation of 1,512 µg/L, the DOH has determined that the facility will be able to comply with proposed arsenic effluent limitations.

- v. **Anti-backsliding.** Anti-backsliding requirements are satisfied because the previous permit did not contain effluent limitations for arsenic at Outfall Serial No. 001.

(b) Mercury at Outfall Serial No. 001

- i. **Mercury Water Quality Standards.** The most stringent applicable water quality standard for mercury, expressed as dissolved mercury, is the chronic aquatic life water quality standard of 0.025 µg/L, which converts to a total recoverable mercury water quality standard of 0.029 µg/L, as specified in HAR, Chapter 11-54, using EPA's recommend conversion factor of 0.85. The fish consumption water quality standard, 0.047 µg/L, is less stringent than the chronic aquatic life water quality standard. Therefore, the chronic aquatic life water quality standard is used in the RPA.
- ii. **RPA Results.** Outfall Serial No. 001 had one data point for mercury ($n = 1$), resulting in a $CV = 0.6$. Based on a CV of 0.6 and one sample, the 95% multiplier from Table 3.1 of the TSD was 6.2. As discussed in Part D.2.d.(3) of this fact sheet, the facility is granted a dilution of 42:1. Therefore, $Dm = 2.3\%$.

The maximum effluent concentration for mercury was 0.64 µg/L.

$$\begin{aligned}\text{Projected Maximum RWC} &= \text{MEC} \times 95\%_{\text{ratio}} \times Dm \\ &= (0.64 \text{ µg/L}) \times 6.2 \times 0.023 \\ &= 0.09 \text{ µg/L}\end{aligned}$$

$$\text{HAR 11-54 Water Quality Standard} = 0.029 \text{ µg/L}$$

The projected maximum receiving water concentration (0.09 µg/L) exceeds the most stringent applicable water quality standard for this pollutant (0.029 µg/L), demonstrating reasonable potential. Therefore, the draft permit establishes effluent limitations for mercury at Outfall Serial No. 001.

- iii. **Mercury WQBELs.** WQBELs for mercury calculated using STCP procedures, with a dilution credit of 42, are based on the chronic aquatic life water quality standard. The draft permit establishes a daily maximum effluent limitation for mercury of 1.2 µg/L from Outfall Serial No. 001. 30-day average effluent limitations for

mercury are calculated using the minimum dilution of 42 and the fish consumption standard of 0.047 µg/L, as required by the STCP. However, the 30-day average effluent limitation, calculated to be 2.0 µg/L, is less stringent than the maximum daily effluent limitation that will protect the beneficial uses of the receiving water. Therefore, the draft permit only establishes the maximum daily effluent limitation of 1.2 µg/L.

- iv. **Feasibility.** The maximum effluent concentration reported for mercury from Outfall Serial No. 001 during the term of the previous permit was 0.64 µg/L. Since the maximum effluent concentration is less than the proposed effluent limitation of 1.2 µg/L, the DOH has determined that the facility will be able to comply with proposed mercury effluent limitations.
- v. **Anti-backsliding.** Anti-backsliding requirements are satisfied because the previous permit did not contain effluent limitations for mercury at Outfall Serial No. 001.

(c) Nickel at Outfall Serial No. 001

- i. **Nickel Water Quality Standards.** The most stringent applicable water quality standard for nickel, expressed as dissolved nickel, is the chronic aquatic life water quality standard of 8.3 µg/L, which converts to a total recoverable nickel water quality standard of 8.4 µg/L, as specified in HAR, Chapter 11-54, using EPA's recommended conversion factor of 0.99. The fish consumption water quality standard, 33 µg/L is less stringent than the chronic aquatic life water quality standard. Therefore, the chronic aquatic life water quality standard is used in the RPA.
- ii. **RPA Results.** Outfall Serial No. 001 had one data point for nickel ($n = 1$), resulting in a $CV = 0.6$. Based on a CV of 0.6 and one sample, the 95% multiplier from Table 3.1 of the TSD was 6.2. As discussed in Part D.2.d.(3) of this fact sheet, the facility is granted a dilution of 42:1. Therefore, $D_m = 2.3\%$.

The maximum effluent concentration for nickel was 58.2 µg/L.

$$\begin{aligned}\text{Projected Maximum RWC} &= \text{MEC} \times 95\%_{\text{ratio}} \times D_m \\ &= (58.2 \text{ } \mu\text{g/L}) \times 6.2 \times 0.02326 \\ &= 8.59 \text{ } \mu\text{g/L}\end{aligned}$$

$$\text{HAR 11-54 Water Quality Standard} = 8.4 \text{ } \mu\text{g/L}$$

The projected maximum receiving water concentration (8.59 µg/L) exceeds the most stringent applicable water quality standard for this pollutant (8.4 µg/L), demonstrating reasonable potential. Therefore, the draft permit establishes effluent limitations for nickel at Outfall Serial No. 001.

iii. Nickel WQBELs. WQBELs for nickel calculated using STCP procedures, with a dilution credit of 42, are based on the chronic aquatic life water quality standard. The draft permit establishes a daily maximum effluent limitation for nickel of 353 µg/L from Outfall Serial No. 001. 30-day average effluent limitations for nickel are calculated using the minimum dilution of 42 and the fish consumption standard of 33 µg/L, as required by the STCP. However, the 30-day average effluent limitation, calculated to be 1,386 µg/L, is less stringent than the maximum daily effluent limitation that will protect the beneficial uses of the receiving water. Therefore, the draft permit only establishes the maximum daily effluent limitation of 353 µg/L.

iv. Feasibility. The maximum effluent concentration reported for nickel from Outfall Serial No. 001 during the term of the previous permit was 58.2 µg/L. Since the maximum effluent concentration is less than the proposed effluent limitation of 353 µg/L, the DOH has determined that the facility will be able to comply with proposed nickel effluent limitations.

v. Anti-backsliding. Anti-backsliding requirements are satisfied because the previous permit did not contain effluent limitations for nickel at Outfall Serial No. 001.

e. Nutrients at Outfall Serial No. 002

As summarized in Table F-10b, a direct comparison of maximum effluent concentrations for nutrients to the applicable WQS indicate that the Permittee has reasonable potential to discharge effluent with these parameters at concentrations that may exceed or contribute to an exceedance of the WQS. Reasonable potential for total nitrogen, nitrate + nitrite nitrogen, and total phosphorus has been determined at Outfall Serial No. 002. Thus, effluent limitations must be established for these parameters.

No dilution or ZOM has been granted at Outfall Serial No. 002. Based on a monthly monitoring requirement, DOH has determined that for nutrients, the application of geometric mean over a calendar year, and the 10th percentile established as a single sample maximum, will be protective of water quality. Establishing a single sample maximum based on the 10th percentile

effectively prohibits the discharge of pollutants greater than the 10th percentile value, and is protective of the 2 percentile WQS.

Applicable water quality-based effluent limitations for Outfall Serial No. 002 are summarized below:

Table F-11. Summary of Effluent Limitations for Nutrients at Outfall Serial No. 002

Parameter	Units	Effluent Limitations	
		Annual Geometric Mean	Single Sample Maximum
Total Nitrogen	µg/L	110	180
Nitrate + Nitrite Nitrogen	µg/L	3.5	10.0
Total Phosphorus	µg/L	16.00	30.0

Effluent data for total nitrogen, nitrate + nitrite, and total phosphorus indicate maximum effluent concentrations of 349 µg/L, 179 µg/L, and 35 µg/L, and average concentrations of 255 µg/L, 154 µg/L and 24 µg/L, respectively. Based on this data, it may not be feasible for the Permittee to immediately comply with final end-of-pipe effluent limitations for total nitrogen, nitrate + nitrite, and total phosphorus at Outfall Serial No. 002. Compliance with the applicable effluent limitations will take substantial and costly facility alterations. Consistent with HAR 11-55-21, this permit establishes a compliance schedule for the Permittee to comply with final effluent limitations for total nitrogen, nitrate + nitrite, and total phosphorus as soon as possible, but no longer than five (5) years.

During the compliance schedule, the Permittee is required to maintain current treatment capability. Interim effluent limitations for total nitrogen, nitrate + nitrite, and total phosphorus have been established until the final effluent limitations become effective. Interim effluent limitations have been established based on effluent data from 2006 through 2013. A single sample maximum effluent limitation has been established equal to the maximum effluent concentration and an annual geometric mean effluent limitation has been established based on the highest observed annual geometric mean.

Table F-12. Summary of Interim Effluent Limitations for Nutrients at Outfall Serial No. 002

Parameter	Units	Effluent Limitations	
		Annual Geometric Mean	Single Sample Maximum
Total Nitrogen	µg/L	395	1,027
Nitrate + Nitrite Nitrogen	µg/L	197	297
Total Phosphorus	µg/L	25	35

f. pH at Outfall Serial Nos. 001 and 002

The draft permit establishes an end-of-pipe effluent limitation for pH at Outfall Serial No. 002 of 7.6 – 8.6. This pH effluent limitation is established in accordance with WQS for open coastal waters in HAR, Section 11-54-6(b)(3). ZOM data, as summarized in Table F-19 of this Fact Sheet, indicates that assimilative capacity for pH is available at Outfall Serial No. 001, and receiving water quality is not negatively impacted by the discharge through Outfall Serial No. 001. Because assimilative capacity exists in the receiving water for pH, and the Permittee has been granted a ZOM, compliance with the WQS for pH at Outfall Serial No. 001 shall be determined at the edge of the ZOM.

g. Storm Water – Outfall Serial Nos. 003 and 004

The storm water discharges from the facility are subject to the Storm Water Discharges Associated With Industrial Activity NPDES requirements under 40 CFR Part 122.26(b)(14)(ii). Accordingly, the proposed storm water runoff discharge conditions and requirements are incorporated in the draft permit based on Appendix B of HAR, Chapter 11-55, *NPDES General Permit for Storm Water Associated with Industrial Activities*. The Permittee is also required to implement and revise its Storm Water Pollution Control Plan (SWPCP), as discussed in Part G.4.a of this Fact Sheet. The storm water requirements are retained from the previous permit.

In addition, a benchmark value for TSS has been established. On May 27, 2009 EPA's 2008 Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP) became effective. The MSGP establishes benchmarks for TSS of 100 mg/L for highly industrial industries such as sawmills, asphalt paving and roofing materials, asphalt emulsion, concrete and gypsum product manufacturing, mining for various metals, coal mining, sand and gravel mining, mine dewatering, landfills, automobile salvage yards, recycling facilities, grain mill products, and fats and oil production. As such, a benchmark value of 100 mg/L has been determined to be appropriate for industrial storm water runoff. Data collected from December 2007 through December 2010 indicate TSS concentrations as high as 232 mg/L at Outfall Serial No. 003 and 1,290 mg/L at Outfall Serial No. 004. Thus, this Permit establishes a benchmark for TSS of 100 mg/L at Outfall Serial Nos. 003 and 004. The Permittee shall revise and update their SWPCP to meet the storm water benchmark of 100 mg/L. During each monitoring event in which the benchmark is exceeded, the Permittee shall investigate and implement additional BMPs necessary to comply with the applicable benchmark, and revise their SWPCP accordingly.

Storm water requirements contained in the permit include:

- (a) Numeric effluent limitations and monitoring requirements for commingled storm water at Outfall Serial No. 001;
- (b) Numeric effluent limitations, benchmarks for TSS, and monitoring requirements for storm water discharges through Outfall Serial Nos. 003 and 004; and
- (c) The implementation and renewal of a SWPCP.

h. Whole Effluent Toxicity (WET)

WET limitations protect receiving water quality from the aggregated toxic effect of a mixture of pollutants in an effluent. WET tests measure the degree of response of exposed aquatic test organisms to an effluent or receiving water. The WET approach allows for protection of the narrative criterion specified in HAR, Chapter 11-54-4(b)(2) while implementing Hawaii's numeric WQS for toxicity. There are two types of WET tests – acute and chronic. An acute toxicity test is conducted over a short period of time and measures mortality. A chronic toxicity test is generally conducted over a longer period of time and may measure mortality, reproduction, or growth.

The previous permit established a chronic WET effluent limitation at Outfall Serial No. 001 and a WET effluent limitation defined as less than 70 percent mean fertilization in 100 percent effluent for *Tripneustes gratilla* at Outfall Serial No. 002.

As summarized in Table F-7a of this Fact Sheet, effluent data from the Permittee using the test species *T. gratilla* indicates that the Permittee frequently exceeded the effluent limitation for chronic toxicity of 42 TU_c established in the previous permit for Outfall Serial No. 001, with effluent results greater than 168 TU_c. Thus, reasonable potential for chronic toxicity has been determined at Outfall Serial No. 001 for chronic toxicity.

As summarized in Table F-7.b of this Fact Sheet, effluent data from the Permittee using the test species *T. gratilla* indicates that the Permittee frequently exceeded the effluent limitation for acute toxicity of 70 percent survival in 100 percent effluent established in the previous permit for Outfall Serial No. 002, with a minimum survival percentage of 0 percent. Thus, reasonable potential for toxicity has been determined at Outfall Serial No. 002.

Based on HAR, Chapter 11-54-4(b)(4), the Director may apply more stringent requirements to ensure compliance with the toxicity standards in HAR, Chapter 11-54-4(b)(2). Acute toxicity effluent limitations may not account for non-fatal toxic impacts that may occur in the receiving water. As such, more

protective chronic toxicity effluent limitations have established at Outfall Serial No. 002.

Chronic WET effluent limitations have been established at Outfall Serial Nos. 001 and 002. For improved WET analysis, DOH has begun implementing EPA's Test of Significant Toxicity Method (TST) for WET effluent limitations within the State. As such, the chronic WET effluent limitation at Outfall Serial No. 001 has been revised to be consistent with the TST method using *T. gratilla*. The use of *T. gratilla* for toxicity tests is not appropriate for effluents without dilution with effluent salinity below 30 ppt. Because the effluent from Outfall Serial No. 002 may be less than 30 ppt at times, and no dilution is granted for Outfall Serial No. 002, the use of *T. gratilla* for chronic toxicity monitoring at Outfall Serial No. 002 is not appropriate. As such, the Permittee will be required to conduct a toxicity species screening, using *Mysidopsis bahia* (shrimp), *Medinia beryllina* (Silversides), and *Atherinops affinis* (topsmelt) during the first 3 months of the permit term. The Permittee will then continue to conduct toxicity testing using the most sensitive of the three species.

As previously discussed, reasonable potential for WET has been determined for Outfall Serial Nos. 001 and 002 and effluent limitations must be established in accordance with 40 CFR 122.44(d)(1). Further, a WET effluent limitation and monitoring are necessary to ensure compliance with applicable WQS in HAR, Chapter 11-54-4(b)(2).

The proposed WET limitation and monitoring requirements are incorporated into the draft permit in accordance with the EPA national policy on water quality-based permit limitations for toxic pollutants issued on March 9, 1984 (49 FR 9016), HAR, Section 11-54-4(b)(2)(B), and EPA's National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document (EPA 833-R-10-003, 2010).

Consistent with HAR, Chapter 11-54-4(b)(2)(B), this Permit establishes a chronic toxicity effluent limitation based on the TST hypothesis testing approach. The TST approach was designed to statistically compare a test species response to the in-stream waste concentration (IWC) and a control.

The following equation is used to calculate the IWC where dilution is granted (Outfall Serial No. 001):

$$\begin{aligned} \text{IWC} &= 100/\text{critical dilution factor} \\ &= 100/42 \\ &= 2.4\% \end{aligned}$$

Because no dilution is granted for Outfall Serial No. 002, an IWC of 100% shall be used.

For any one chronic toxicity test, the chronic WET permit limit that must be met is rejection of the null hypothesis (H_0):
IWC (e.g., 2.4 or 100 percent effluent) mean response $\leq 0.75 \times$ Control mean response.

A test result that rejects this null hypothesis is reported as “Pass.” A test result that does not reject this null hypothesis is reported as “Fail”

The acute and chronic biological effect levels (b values of 20% and 25%, respectively) incorporated into the TST define EPA’s unacceptable risks to aquatic organisms and substantially decrease the uncertainties associated with the results obtained from EPA’s traditionally used statistical endpoints for WET. Furthermore, the TST reduces the need for multiple test concentrations which, in turn, reduces laboratory costs for dischargers while improving data interpretation. A significant improvement offered by the TST approach over traditional hypothesis testing is the inclusion of an acceptable false negative rate. While calculating a range of percent minimum significant differences (PMSDs) provides an indirect measure of power for the traditional hypothesis testing approach, setting appropriate levels for β and α using the TST approach establishes explicit test power and provides motivation to decrease within test variability which significantly reduces the risk of under reporting toxic events (USEPA 20101).

Taken together, these refinements simplify toxicity analyses, provide dischargers with the positive incentive to generate high quality data, and afford effective protection to aquatic life.

A WET effluent limitation based on the TST hypothesis testing approach is protective of the WQS for toxicity contained in HAR, Section 11-54-4(b)(4)(B) and is not considered to be less stringent. Use of the TST approach is consistent with the requirements of State and federal anti-backsliding regulations.

i. Summary of Final Effluent Limitations

In addition to the effluent limitations specified above, HAR Section 11-55-20 requires that daily quantitative limitations by weight be established where possible. Thus, in addition to concentration based-effluent limitations,

¹ U.S. Environmental Protection Agency. 2002a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (5th Edition). EPA 821-R-02-012. Washington, DC: Office of Water.

mass-based effluent limitations (in pounds per day) have been established where applicable based on the following formula:

$$\text{lbs/day} = 8.34 * \text{concentration (mg/L)} * \text{flow (MGD)}$$

40 CFR 122.45(b)(2) requires that mass-based effluent limitations for industrial facilities be based on a reasonable measure of actual production of the facilities. The long term average flow, as reported in the NPDES Application Form 2C at Outfall Serial No. 001, was 2.4 MGD. However, for WQBELs, mass-based effluent limitations were based on an observed maximum effluent flow of 4.08 MGD. The draft permit establishes mass-based effluent limitations for arsenic, mercury, nickel, total nitrogen, ammonia nitrogen at Outfall Serial No. 001.

The long term average flow, as reported in the NPDES Application Form 2C at Outfall Serial No. 002, was 1.2 MGD. The maximum observed effluent flow was also 1.2 MGD. Thus, mass-based effluent limitations for WQBELs were based on 1.2 MGD. The draft permit establishes mass-based effluent limitations for total nitrogen, nitrate + nitrite nitrogen and total phosphorus at Outfall Serial No. 002.

As described in Part D.1.b, the draft permit established technology-based effluent limitations on actual facility production.

The following tables list final effluent limitations contained in the draft permit and compares them to effluent limitations contained in the previous permit.

(1) Outfall Serial No. 001

- (a) Effluent limitations for treated process wastewater are listed in the table below. Compliance with these effluent limitations shall be determined by monitoring the treated process wastewater after treatment and prior to commingling with once-through non-contact brine well cooling water, at Monitoring Location INT-001A.

Table F-13. Summary of Effluent Limitations – Treated Process Wastewater

Parameter	Units	Effluent Limitations Contained in the Previous Permit ¹		Proposed Effluent Limitations ¹	
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
pH	pH Units	Not less than 6.0 standard units nor greater than 9.0 standard units		Not less than 6.0 standard units nor greater than 9.0 standard units	
BOD ₅	lbs/day	284	511	274	494
TSS	lbs/day	227	356	220	344

Parameter	Units	Effluent Limitations Contained in the Previous Permit ¹		Proposed Effluent Limitations ¹	
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
TOC	lbs/day	624	1,124	603	1,087
Oil and Grease	lbs/day	83	155	80	150
Phenols	lbs/day	1.27	3.82	1.27	3.8
Ammonia Nitrogen	lbs/day	155	341	150	329
Total Sulfide	lbs/day	1.5	3.36	1.4	3.2
Total Chromium	lbs/day	1.72	4.36	1.5	4.36
Hexavalent Chromium	lbs/day	0.14	0.29	0.14	0.28

¹ Compliance with technology-based effluent limitations contained in the previous permit was determined at Outfall Serial No. 001. Compliance with the proposed technology-based effluent limitations listed in the table above is determined at a location after treatment and prior to commingling with once-through non-contact brine well cooling water.

(b) Discharge Limitation Allocations for Treated Contaminated Storm Water Runoff from Process Areas.

The quantity of pollutants discharged (lbs/day) shall not exceed the quantity determined by multiplying the flow of contaminated runoff times the limits listed below. Compliance with these effluent limitations shall be determined by monitoring the treated process wastewater after treatment and prior to commingling with once-through non-contact brine well cooling water, at Monitoring Location INT-001A:

Table F-14. Summary of Discharge Limitation Allocations

Parameter	Effluent Limitations Contained in the Previous Permit		Proposed Effluent Limitations	
	Monthly Average (lbs/1,000 gallons)	Daily Maximum (lbs/1,000 gallons)	Monthly Average (lbs/1,000 gallons)	Daily Maximum (lbs/1,000 gallons)
BOD ₅	0.22	0.40	0.22	0.40
Total Suspended Solids	0.18	0.28	0.18	0.28
Oil and Grease	0.067	0.13	0.067	0.13
Phenols	0.0014	0.0029	0.0014	0.0029
Total Chromium	0.0018	0.0050	0.0018	0.0050
Hexavalent Chromium	0.00023	0.00052	0.00023	0.00052
Total Organic Carbon	0.484	0.88	0.484	0.88

(c) Effluent limitations for once-through non-contact brine well water are listed in the table below. Compliance with these effluent limitations shall be determined by monitoring the once-through

non-contact brine well cooling water prior to commingling with the treated process wastewater, at Monitoring Location INT-001B.

Table F-15. Summary of Effluent Limitations – Once-through Non-contact Brine Well Cooling Water

Parameter	Units	Effluent Limitations Contained in the Previous Permit ¹		Proposed Effluent Limitations ¹	
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
TOC	mg/L	--	--	5.0	5.0

¹ Compliance with technology-based effluent limitations contained in the previous permit was determined at Outfall Serial No. 001. Compliance with the proposed technology-based effluent limitations listed in the table above is determined at a location prior to commingling with treated process wastewater.

(d) Final, end-of-pipe effluent limitations for Outfall Serial No. 001 are listed in the tables below.

Table F-16a. Summary of Effluent Limitations – Outfall Serial No. 001

Parameter	Units	Effluent Limitations Contained in the Previous Permit		Proposed Effluent Limitations	
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
pH	pH Units	Not less than 6.0 standard units nor greater than 9.0 standard units		1	
Arsenic, Total Recoverable	µg/L	--	--	--	1,512
	lbs/day	--	--	--	51
Mercury, Total Recoverable	µg/L	--	--	--	1.2
	lbs/day	--	--	--	0.04
Nickel, Total Recoverable	µg/L	--	--	--	353
	lbs/day	--	--	--	12
Whole-Effluent Toxicity	NOEC ≤ 42.0 TU _c			2	

¹ WQBELs have been established at the edge of the ZOM. Technology-based effluent limitations remain applicable for treated process water, as summarized in Table F-13 of this Fact Sheet.

² As described in Part D.2.h of this Fact Sheet.

(2) Outfall Serial No. 002

Effluent limitations for once-through non-contact bring well cooling water at Outfall Serial No. 002 are listed in the tables below.

Table F-17a. Summary of Effluent Limitations – Outfall Serial No. 002

Parameter	Units	Effluent Limitations Contained in the Previous Permit		Proposed Effluent Limitations	
		Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
pH	pH Units	Not less than 6.0 standard units nor greater than 9.0 standard units		Not less than 7.6 standard units nor greater than 8.6 standard units	
TOC	mg/L	5.0	5.0	5.0	5.0
Whole-Effluent Toxicity	70% mean fertilization in 100% effluent			1	

¹ As described in Part D.2.h of this Fact Sheet.

Table F-17b. Summary of Effluent Limitations – Outfall Serial No. 002

Parameter	Units	Effluent Limitations Contained in the Previous Permit	Proposed Effluent Limitations	
			Annual Geometric Mean	Single Sample Maximum
Total Nitrogen	µg/L	--	110 ¹	180 ¹
	lbs/day	--	1.1 ¹	1.8 ¹
Nitrate + Nitrite Nitrogen	µg/L	--	3.5 ²	10.0 ²
	lbs/day	--	0.04 ²	0.10 ²
Total Phosphorus	µg/L	--	16.0 ³	30.0 ³
	lbs/day	--	0.16 ³	0.30 ³

¹ **Final Effluent Limitations** (effective 5 years after the effective date of the final permit): Discharge from the facility shall not exceed an annual geometric mean of 110.0 µg/L (1.1 lbs/day) nor a single sample maximum of 180.0 µg/L (1.8 lbs/day).

Interim Effluent Limitations (effective 5 years after the effective date of the final permit): Discharge from the facility shall not exceed an annual geometric mean of 395 µg/L (2.55 lbs/day) nor a single sample maximum of 1,027 µg/L (3.5 lbs/day).

² **Final Effluent Limitations** (effective 5 years after the effective date of the final permit): Discharge from the facility shall not exceed an annual geometric mean of 3.5 µg/L (0.04 lbs/day) nor a single sample maximum of 10.0 µg/L (0.10 lbs/day).

Interim Effluent Limitations (effective 5 years after the effective date of the final permit): Discharge from the facility shall not exceed an annual geometric mean of 197 µg/L (1.54 lbs/day) nor a single sample maximum of 297 µg/L (1.8 lbs/day).

³ **Final Effluent Limitations** (effective 5 years after the effective date of the final permit): Discharge from the facility shall not exceed an annual geometric mean of 16.0 µg/L (0.16 lbs/day) nor a single sample maximum of 30.0 µg/L (0.30 lbs/day).

Interim Effluent Limitations (effective 5 years after the effective date of the final permit): Discharge from the facility shall not exceed an annual geometric mean of 25 µg/L (0.24 lbs/day) nor a single sample maximum of 35 µg/L (0.4 lbs/day).

j. Satisfaction of Anti-Backsliding Requirements

The CWA specifies that a revised permit may not include effluent limitations that are less stringent than the previous permit unless a less stringent limitation is justified based on exceptions to the anti-backsliding provisions contained in CWA Sections 402(o) or 303(d)(4), or, where applicable, 40 CFR

122.44(l). These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed.

The effluent limitation of 6.0 through 9.0 for pH at Outfall Serial No. 001 has not been carried over. This effluent limitation was based on applicable technology-based effluent limitations and was inappropriately applied to a commingled discharge (treated process wastewater and non-contact cooling water), at the end-of-pipe. Compliance with technology-based effluent limitations is required prior to commingling with other waste streams to ensure dilution does not occur. Thus, consistent with the requirements of the ELGs, this permit establishes the technology-based effluent limitation for the treated process wastewater prior to commingling with the non-contact brine cooling water. Further, compliance with WQS is required at the edge of the ZOM. Together, these requirements are more stringent than the previous end-of-pipe effluent limitation of 6.0 through 9.0.

The effluent limitations and other requirements established by the draft permit are at least as stringent as the effluent limitations in the previous permit and are consistent with state and federal anti-backsliding regulations.

k. Satisfaction of Antidegradation Policy Requirements

The DOH established the State antidegradation policy in HAR, Section 11-54- 1.1, which incorporates the federal antidegradation policy at 40 CFR 131.12. HAR, Section 11-54-1.1 requires that the existing quality of waters be maintained unless degradation is justified based on specific findings demonstrating that allowing lower water quality is necessary to accommodate economic or social development in the area in which the waters are located. The draft permit does not allow for an increase in flow or mass of pollutants to the receiving water. The permitted discharge is consistent with antidegradation provisions of 40 CFR 131.12 and HAR, Section 11-54-1.1. The impact on existing water quality will be insignificant and the level of water quality necessary to protect the existing uses will be maintained and protected.

E. Rationale for Receiving Water and Zone of Mixing Requirements

1. Summary of ZOM Water Quality Standards and Monitoring Data

The following are Specific Water Quality Criteria Parameters for the effluent that were provided in the ZOM Application on July 30, 2010, and applicable ZOM water quality criteria from 11-54-6(a)(3).

Table F-18. ZOM Monitoring Data

Parameter	Units	Applicable Water Quality Standard	Maximum Reported Concentration ¹
Total Nitrogen	µg/L	110 ²	2,500
Ammonia Nitrogen	µg/L	2.0 ²	670
Nitrate + Nitrite	µg/L	3.5 ²	1,330
Orthophosphate Phosphorus	µg/L	--	44
Total Phosphorus	µg/L	16 ²	90
Chlorophyll <u>a</u>	µg/L	0.15 ²	0
Turbidity	NTU	0.20 ²	0
Nonfilterable Residue	mg/L	--	34.8
pH	s.u.	³	7.6
Dissolved Oxygen	mg/L	⁴	3.5
Temperature	°C	⁵	29
Salinity	ppm	⁶	27.8

¹ Source: ZOM Application dated July 30, 2010.

² Water quality standard expressed as a geometric mean.

³ pH shall not deviate more than 0.5 units from a value of 8.1.

⁴ Dissolved oxygen shall not be less than 75 percent saturation.

⁵ Temperature shall not vary more than 1° Celsius from ambient conditions.

⁶ Salinity shall not vary more than 10 percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

2. Existing Receiving Water Limitations and Monitoring Data

Tables F-19 and F20, below, summarize ZOM monitoring data and applicable WQS the Permittee reported in quarterly DMRs from March 2009 to August 2013. 2. Table F-19 lists the maximum temperature, and salinity; the maximum and minimum pH; and the minimum dissolved oxygen percent saturation for the ZOM from the August 2011 to August 2013 DMRs.

Table F-20 is a summary of the maximum annual geometric means calculated for each ZOM monitoring station for parameters with WQS based on the geometric mean. The geometric means were calculated from the quarterly DMRs from March 2009 to August 2013, unless otherwise noted, for each ZOM monitoring station.

The receiving water stations at the edge of the mixing zone are labeled S4, S5, S6, and S7; control stations are labeled C8 and C9; and stations inside the ZOM are labeled S1, S2, S3, and S10. For each station with a water column depth greater than 10 meters, the Permittee reported top and middle samples, and for each station with a water column less than 10 meters deep, the Permittee reported top and bottom samples, as required in the previous permit. Receiving water monitoring locations are further discussed in Part F.3 of this Fact Sheet.

Table F-19. Receiving Water Monitoring Data

Station ¹	Water Column Location	pH ²		Temperature ²	Salinity ²	Dissolved Oxygen ²
		(pH Units)		°C	ppm	% Saturation
		Minimum	Maximum	Maximum	Maximum	Minimum
S1	Top	8.04	8.25	26.84	35.41	94.4
	Bottom	8.04	8.25	26.87	35.42	90.6
S2	Top	8.05	8.27	26.98	35.36	98.6
	Middle	8.06	8.27	26.98	35.38	95.1
S3	Top	8.06	8.28	26.95	35.36	98.5
	Bottom	8.07	8.28	26.97	35.39	97.0
S4	Top	8.04	8.25	26.80	35.33	98.4
	Bottom	8.05	8.25	26.78	35.34	93.3
S5	Top	8.07	8.27	27.18	35.34	98.6
	Middle	8.07	8.31	27.02	35.42	98.1
S6	Top	8.07	8.27	27.24	35.35	96.4
	Middle	8.03	8.32	24.12	35.39	94.2
S7	Top	8.04	8.24	27.04	35.38	95.9
	Bottom	8.03	8.27	27.05	35.37	96.3
CP8	Top	8.03	8.27	27.06	35.36	93.8
	Bottom	8.06	8.31	27.05	35.40	88.4
CP9	Top	8.05	8.24	26.75	35.31	97.4
	Middle	8.05	8.24	26.75	35.31	94.5
S10	Top	8.04	8.25	27.00	35.37	96.7
	Bottom	8.04	8.25	27.04	35.338	96.8
Applicable Water Quality Standard		7.6	8.6	3	4	5

¹ Compliance with ZOM limitations shall be measured at the four stations at the edge of the ZOM, Stations 4, 5, 6, and 7.

² Source for All Data: Quarterly DMRs submitted by the Permittee from August 2011 and August 2013.

³ The temperature shall not vary more than 1° C from ambient conditions.

⁴ Salinity shall not vary more than 10 percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

⁵ Dissolved oxygen shall not be less than 75 percent saturation, determined as a function of ambient water temperature and salinity.

Table F-20. Receiving Water Monitoring Data

Station ¹		Highest Geometric Mean						
		Total Nitrogen ²	Ammonia Nitrogen ²	Nitrate + Nitrite ²	Total Phosphorus ³	Chlorophyll <u>a</u> ³	Turbidity ³	Total Phosphate ³
		µg/L	µg/L	µg/L	µg/L	µg/L	NTU	µg/L
Within ZOM	S1	129.13	16.59	4.34	14.1	0.15	0.34	2.86
	S2	97.95	1.75	1.41	13.8	0.09	0.15	4.42
	S3	97.45	1.60	1.67	13.8	0.09	0.11	3.99
	S10	93.24	1.82	2.7	13.0	0.14	0.23	3.54
ZOM Boundary	S4	109.76	1.61	1.90	12.9	0.13	0.21	3.27
	S5	109.27	1.55	0.49	13.1	0.07	0.37	2.62
	S6	109.49	1.79	0.40	13.2	0.07	0.26	4.09
	S7	99.48	1.82	2.85	15.3	0.12	0.18	3.22
Controls	C8	106.20	1.54	1.64	13.4	0.10	0.18	3.30

Station ¹	Highest Geometric Mean						
	Total Nitrogen ²	Ammonia Nitrogen ²	Nitrate + Nitrite ²	Total Phosphorus ³	Chlorophyll a ³	Turbidity ³	Total Phosphate ³
	µg/L	µg/L	µg/L	µg/L	µg/L	NTU	µg/L
C9	112.52	2.32	1.19	12.8	0.17	0.24	3.39
Applicable Water Quality Standard	110	2.0	3.50	16.0	0.15	0.20	--

¹ Compliance with ZOM limitations shall be measured at the four stations at the edge of the ZOM, Stations 4, 5, 6, and 7.

² Source for ZOM Boundary and Control Data: Quarterly DMRs submitted by the Permittee from March 2009 and August 2013. Source for Within ZOM Data: Quarterly DMRs submitted by the Permittee from August 2011 and August 2013.

³ Source for All Data: Quarterly DMRs submitted by the Permittee from August 2011 and August 2013.

3. Proposed Receiving Water Limitations

a. Basic Water Quality Criteria Applicable to All Waters

- (1) The discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the DOH, as required by the Water Quality Act of 1987 (P.L. 100-4) and regulations adopted thereunder. The DOH adopted WQS specific for open coastal waters in HAR, Chapter 11-54. The draft permit incorporates receiving water limitations and requirements to ensure the facility does not exceed applicable WQS. ZOM requirements for total nitrogen and ammonia nitrogen have not been established since end-of-pipe effluent limitations have been established and will be used to determine compliance with applicable WQS.
- (2) The Pacific Ocean is designated as "Class A Dry Open Coastal Waters." As such, the discharge from the facility shall not interfere with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife and allows recreational activities in and on the water. The draft permit incorporates receiving water limitations for the protection of the beneficial uses the Pacific Ocean. Water quality-based effluent limitations for total nitrogen and ammonia nitrogen have been applied end-of-pipe.

The Permittee is required to comply with the HAR, Chapter 11-54, Basic Water Quality Criteria of which has been incorporated as part of the draft permit under Section 1 of the DOH Standard NPDES Permit Conditions, dated December 30, 2005.

b. Specific Criteria for “Class A Dry Open Coastal Waters”

Table F-21. Specific Criteria for “Class A Dry Open Coastal Waters”

Parameter	Units	Geometric mean not to exceed the given value	Not to exceed the given value more than 10% of the time	Not to exceed the given value more than 2% of the time
Nitrate + Nitrite	µg/L	3.50	10.00	20.00
Total Phosphorus	µg/L	16.00	30.00	45.00
Light Extinction Coefficient	k units	0.10	0.30	0.55
Chlorophyll <i>a</i>	µg/L	0.15	0.50	1.00
Turbidity	NTU	0.20	0.50	1.00
pH	standard units	Shall not deviate more than 0.5 standard units from a value of 8.1.		
Dissolved Oxygen	mg/L	Shall not be less than 75 percent saturation, determined as a function of ambient water temperature and salinity.		
Temperature	°C	Shall not vary more than 1°C from ambient conditions.		
Salinity	ppm	Shall not vary more than 10 percent from natural or seasonal changes considering hydrologic input and oceanographic factors.		

The specific water quality criteria listed at HAR, Section 11-54-6(b)(3) for “Class A, Dry Open Coastal Waters” shall apply to the discharge through Outfall Serial No. 001, as seen in the table above, except that the specific water quality criteria for the parameters listed below may be exceeded within the ZOM.

- Nitrate + Nitrite
- Total Phosphorus
- Chlorophyll *a*
- Turbidity
- pH
- Temperature
- Salinity

The requirements above are necessary for the protection of the beneficial uses of the Pacific Ocean. These requirements are consistent with HAR, Chapter 11-54 and retained from the previous permit.

c. Zone of Mixing (ZM-202)

HAR, Chapter 11-54 allows for a mixing zone if the ZOM is in compliance with requirements in HAR, Section 11-54-9(c). The Permittee has requested that the existing ZOM for the assimilation of once-through non-contact brine well cooling water, treated process wastewater, and treated contaminated storm water runoff from the Pacific Ocean be retained. The ZOM requested the water area of the Pacific Ocean, described as the area of radius 1,500 meters (4,875 feet) about the Outfall Serial No. 001 discharge located at coordinates: Latitude 21°18'16.71"N and Longitude 158°07'01.94"W as delineated on the attached map in Figure 2 of the draft permit. The ZOM shall be extended vertically from the surface to the ocean bottom.

(1) Prior to the renewal of a ZOM, the environmental impacts, protected uses of the receiving water, existing natural conditions, character of the effluent, and adequacy of the design of the outfall must be considered. The following findings were considered:

- (a) The Permittee's ZOM application indicates that ZOM is located above a scoured limestone shelf with relatively low relief consisting of a coral rubble and sand bottom, and that the area does not support commercial fishing because of the absence of suitable habitat, however the shore area does support surfing and fishing.
- (b) The diffuser for Outfall Serial No. 001 reportedly provides a minimum of 42:1 dilution and discharges approximately 1,200 feet offshore. No information provided in the ZOM application indicates that dilution would be negatively impacted by current conditions.
- (c) Biological monitoring of the Facility's diffuser conducted by the University of Hawaii on August 26, 2009 found micromollusk species indicative of habitat degradation were not found or present in very low numbers in the vicinity of the diffuser and that no evidence of negative impacts to fish populations due to the diffuser were identified.

A decline in coral population was observed, however the study report states, *"The continuing decline in the coral population on the saddles reflects the age of the colonies on these saddles. Many of these colonies are close to the maximum size of colonies of Pocillopora meandrina (Grigg and Maragos 1974, Kolinski and Cox, personal observations). Although there was no recruitment to the saddles during 2008 to 2009, recruitment of corals in Hawaii is highly variable in both time and space... Remaining colonies on these saddles are showing fairly consistent rates of growth, indicating that this environment is suitable for growth."*

(2) HAR 11-54-9(c)(5) prohibits the establishment of a ZOM unless the application and supporting information clearly show: that the continuation of the ZOM is in the public interest; the discharge does not substantially endanger human health or safety; compliance with the WQS would produce serious hardships without equal or greater benefits to the public; and the discharge does not violate the basic standards applicable to all waters, will not unreasonably interfere with actual or probable use of water areas for which it is classified, and has received the best degree of treatment or control. The following findings were made in consideration of HAR 11-54-9(c)(5):

- (a) The Facility is one of two petroleum manufacturing facilities in the State. Approximately 90 percent of the State's total energy consumption is derived from crude oil based products. Roughly 36 percent of the entire market's petroleum needs are produced by the Permittee. The Facility directly employs approximately 185 workers and contributes significantly to the local economy.
- (b) No known information indicates that the discharge is causing or contributing to conditions that substantially endanger human health or safety. The Permittee reports those regular observations and scheduled inspections both underwater and of the adjacent shoreline areas indicate that the risk to human health or safety is low and no human health or safety impacts have been documented. Further, the permit requires the Permittee to conduct a ZOM Dilution Analysis Study to evaluate the available dilution at the edge of the ZOM within three (3) years of the effective date of the permit and verify the presence or absence of assimilative capacity for nutrients with reasonable potential.
- (c) The feasibility and costs to install treatment necessary to meet applicable WQS end-of-pipe, or additional supporting information, were not provided by the Permittee to demonstrate potential hardships. However, based on effluent data, significant Facility enhancements and capital costs would likely be necessary to comply with applicable WQS for which the ZOM was applied. As discussed in Part E.3.c.(2)(a), the operation of the Facility has been found to benefit the public. No information is known that would revise the finding during the previous permit term that compliance with the applicable WQS without a ZOM would produce serious hardships without equal or greater benefits to the public.
- (d) As discussed in Part D.2.c.(5)(c) of this Fact Sheet, effluent data indicates the presence of pollutants in excess of applicable WQS.

However, this permit establishes water quality-based effluent limitations based on WQS. The Permit requires compliance with the effluent limitations and conditions which are protective of the actual and probable uses of the receiving water and implement applicable technology-based effluent limitations.

The Department has determined that the ZOM satisfies the requirements in HAR, Section 11-54-09(c)(5).

The establishment of this ZOM is subject to the conditions specified in Part C of the draft permit. The draft permit incorporates receiving water monitoring requirements which the DOH has determined are necessary to evaluate compliance of the Outfall Serial No. 001 discharge with the applicable water quality criteria, as described further in Part E of this Fact Sheet.

The Permittee also submitted a ZOM application dated July 10, 2010, for the discharge of once-through non-contact cooling water from Outfall Serial No. 002. However, insufficient information was submitted in order for the DOH to process the ZOM application for the Outfall Serial No. 002 discharge.

F. Rationale Monitoring and Reporting Requirements

40 CFR 122.41(j) specify monitoring requirements applicable to all NPDES permits. HAR Chapter 11-55-28 establishes monitoring requirements applicable to NPDES permits within the State of Hawaii. 40 CFR 122.48 and HAR Chapter 11-55-28 require that all NPDES permits specify requirements for recording and reporting monitoring results. The principal purposes of a monitoring program are to:

- Document compliance with waste discharge requirements and prohibitions established by the DOH;
- Facilitate self-policing by the Permittee in the prevention and abatement of pollution arising from waste discharge;
- Develop or assist in the development of limitations, discharge prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards; and,
- Prepare water and wastewater quality inventories.

The draft permit establishes monitoring and reporting requirements to implement federal and State requirements. The following provides the rationale for the monitoring and reporting requirements contained in the draft permit.

1. Effluent Monitoring

a. Outfall Serial No. 001

The following monitoring requirements are applicable at Outfall Serial No. 001.

(1) Treated Process Wastewater, Monitoring Location INT-001A

Monitoring requirements for pH, BOD₅, TSS, TOC, oil and grease, phenols, ammonia nitrogen, total sulfide, total chromium, and hexavalent chromium have been established in the draft permit in order to determine compliance with effluent limitations. Monitoring shall be conducted at Monitoring Location INT-001A, a location after treatment and prior to commingling with once-through non-contact brine well water. This monitoring location has been established to determine compliance with treated process wastewater technology-based effluent limitations.

(2) Once-through Non-contact Brine Well Cooling Water, Monitoring Location INT-001B

Monitoring requirements for TOC in the once-through non-contact cooling water have been established in the draft permit in order to determine compliance with technology-based effluent limitations for once-through non-contact cooling water. Monitoring shall be conducted at Monitoring Location INT-001B at a location prior to commingling with treated process water effluent.

(3) Outfall Serial No. 001 Monitoring Requirements

Monitoring requirements for discharges from Outfall Serial No. 001 have been established in the draft permit. Monitoring shall be conducted at the final outfall, prior to being discharged to the Pacific Ocean.

- (a)** Monitoring requirements for total phosphorus, total nitrogen, ammonia nitrogen and nitrate + nitrite are retained from the previous permit to enable comparison with the receiving water ZOM monitoring results. Monitoring for pH has been retained to evaluate the cause of any exceedances in the receiving water.
- (b)** Monitoring requirements for silica will assist data interpretation and evaluation of nutrients in the receiving waters. Silica is abundantly found in Hawaiian igneous rock, and therefore typically present in Hawaii's groundwater. The monitoring for silica is commonly performed in Hawaii to assess the influence of groundwater dynamics on nearshore waters. The monitoring data for silica will be used to

evaluate the net contribution of the facility discharge on the receiving waters. Monitoring requirements for silica have been retained from the previous permit.

- (c) Monitoring requirements for total nitrogen and ammonia nitrogen have been retained from the previous permit in order to determine compliance with effluent limitations. Monitoring for pH has been retained to evaluate the cause of any exceedances in the receiving water.
- (d) Monitoring requirements for flow have been retained from the previous permit to calculate pollutant loading and to determine compliance with mass-based effluent limitations.
- (e) Monitoring requirements for arsenic, mercury, and nickel have been established to evaluate compliance with newly established effluent limitations and to collect data for future RPAs. In accordance with the STCP, composite samples for arsenic, mercury, and nickel are required.
- (f) Monitoring requirements for all other pollutants listed in HAR, Section 11-54-4(b)(3) are established in the draft permit in order to collect data for future RPAs.

b. Outfall Serial No. 002

- (1) Monitoring requirements for ammonia nitrogen are established to enable comparison with the receiving water monitoring results.
- (2) Monitoring requirements for silica will assist data interpretation and evaluation of nutrients in the receiving waters. Silica is abundantly found in Hawaiian igneous rock, and therefore typically present in Hawaii's groundwater. The monitoring for silica is commonly performed in Hawaii to assess the influence of groundwater dynamics on nearshore waters. The monitoring data for silica will be used to evaluate the net contribution of the facility discharge on the receiving waters. Monitoring requirements for silica have been retained from the previous permit.
- (3) Monitoring requirements for total nitrogen, nitrate + nitrite nitrogen, total phosphorus, and pH have been retained from the previous permit in order to determine compliance with effluent limitations.
- (4) Monitoring requirements for temperature are retained from the previous permit to enable comparison with the receiving water monitoring results and to determine if the effluent is having a negative impact on water quality.

- (5) Monitoring requirements for all other pollutants listed in HAR, Section 11-54-4(b)(3) are established in the draft permit in order to collect data for future RPAs.

c. Storm Water Monitoring – Outfall Serial Nos. 003 and 004

Monitoring requirements for storm water have been retained from the previous permit in order to determine compliance with storm water limitations and to better characterize storm water discharged into the Pacific Ocean.

2. Whole Effluent Toxicity Monitoring

Monthly whole effluent toxicity testing is required in order to determine compliance with whole-effluent toxicity effluent limitations as specified in Parts A.1, A.2, and B of the draft permit. The monitoring frequency has been increased from semi-annual to monthly because effluent data indicates that the Permittee has reasonable potential to exceed, or contribute to the exceedance of, applicable WQS.

3. Receiving Water Quality Monitoring Requirements

For the establishment of baseline receiving water quality data, the Permittee shall monitor water quality at the following nine stations (at a minimum): one station at the point of discharge (Station S1), four stations along the edge of the ZOM (Stations S4, S5, S6, and S7), two stations at 2,000 feet radius from the discharge point Stations S2 and S3), and two control stations outside the ZM-202 (Station CP8 and CP9) as specified in Part C.4 of the draft permit. The draft permit establishes requirements for the Permittee to monitor at the two (2) control stations, CP8 and CP9. As much as practicable, the locations of the monitoring stations shall be consistent with current ZM-202 monitoring and reporting practices previously used by the Permittee in quarterly DMRs/ZOM reports. These monitoring requirements are necessary to determine compliance with WQS for open coastal waters listed in HAR, Section 11-54-6(b)(3) and are retained from the previous permit.

4. Other Monitoring Requirements

a. Effluent and Receiving Water Monitoring Programs

Consistent with the previous permit, the draft permit requires the Permittee to submit Effluent and Receiving Water Monitoring Programs within 30 calendar days after the effective date of the draft permit, as described in Part E of the draft permit. The Permittee is required to submit these plans so that the DOH can verify that the proposed effluent and receiving water monitoring will be in

compliance with monitoring requirements at 40 CFR 122.41(j), HAR Section 11-55-28, and HAR Section 11-55-29.

b. Bottom Biological Communities Monitoring Program

Consistent with the previous permit and in accordance with HAR, Section 11-54-09(c)(6)(C), the draft permit requires the Permittee to submit a receiving water bottom biological communities monitoring program detailing the requirements within 60 days after the effective date of the draft permit, in accordance with Part C.4.d of the draft permit. This monitoring requirement may be waived upon demonstrating to the Director that either the discharge does not impact the existing bottom biological communities, or no bottom biological communities exist in the receiving water.

c. Production of Crude Throughput

Consistent with the previous permit, the draft permit requires the Permittee to submit a report of the previous calendar year's monthly average production of crude throughput in barrels/day. This requirement retained from the previous permit and is included in the draft permit to allow the DOH to develop technology-based effluent limitations using the ELGs in the drafting of future permit renewals.

G. Rationale for Provisions

1. Standard Provisions

The Permittee is required to comply with DOH Standard NPDES Permit Conditions (Version 14), which are included as part of the draft permit.

2. Monitoring and Reporting Requirements

The Permittee shall comply with all monitoring and reporting requirements included in the draft permit and in the DOH Standard NPDES Permit Conditions.

3. Special Provisions

a. Reopener Provisions

The draft permit may be modified in accordance with the requirements set forth at 40 CFR 122 and 124, to include appropriate conditions or limits based on newly available information or to implement any new state WQS or criteria that are approved by the EPA in accordance with 40 CFR 122.62.

b. Special Studies and Additional Monitoring Requirements

(1) Toxicity Reduction Requirement

The draft permit requires the Permittee to submit an initial investigation Toxicity Reduction Evaluation (TRE) workplan to the Director which shall describe steps which the Permittee intends to follow in the event that toxicity is detected. This requirement is retained from the previous permit and is discussed in detail in Part B.2 of the draft permit.

(2) Groundwater Study

The draft permit requires the Permittee to submit a Groundwater Study Plan and conduct a Groundwater Study. This requirement is based on observations made by the Permittee on April 28-29, 2009, when it was observed that red effluent being stored in the South and North Ocean Surge Ponds were “leaking” to the shoreline. The Permittee also reported that a red color was observed in three adjacent ground water monitoring wells (D7-51, D7-52, and D8-50R).

The South and North Ocean Storm Surge Ponds, oxidation ponds, impounding basins, and post-aeration basin are all unlined. This raises the probability that hydrocarbons and other pollutants from effluents stored in the storm surge ponds and other treatment ponds might be transported to receiving waters as a result of leakage from the Facility. This potential issue should to be investigated for all ponds up-gradient of the ground water wells. Unless the Permittee can demonstrate that soil types and hydrologic gradient differ significantly for the oxidation ponds and impounding basin, the investigation of hydrologic connection should not be limited to the storm surge ponds because the other treatment ponds are also unlined and might also share a hydrologic connection to the ground water and receiving water due to their proximity to the South and North Storm Surge Ponds and the receiving water.

4. Other Special Provisions

a. Storm Water Pollution Control Plan (SWPCP)

The proposed storm water runoff discharge conditions and requirements are incorporated in the draft permit based on Appendix B of HAR, Chapter 11-55 *NPDES General Permit for Storm Water Associated with Industrial Activities*. Accordingly, the Permittee shall update and implement the SWPCP dated November 14, 2006, or more recent version, as established in the previous permit. The Permittee shall update and implement the SWPCP as specified by the schedule in Part A.4.a of the draft permit.

H. Public Participation

As stated in Part A above, the public was afforded two 30-day comment periods during the processing of this permit. Notices were published in the Honolulu Star-Advertiser on July 5, 2012 and September 30, 2013. Ms. Lisa Woods Munger of Goodsill, Anderson, Quinn, and Stifel, on behalf of Chevron Products Company, provided comments during the first public notice comment period. The EPA and Ms. Kris Battleson of Chevron submitted comments as a result of the second public notice.

APPENDIX-1

Derivation of Technology-Based Effluent Limitations Chevron Hawaii Refinery

References

1. 40 CFR 419 – Cracking Subcategory, *Effluent Limitation Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category*
2. *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category*, EPA/4401-82/014
3. *Guide for the Application of Effluent Limitations Guidelines for the Petroleum Refining Industry*, USEPA Office of Water Regulations and Standards
4. Chevron Hawaii Refinery, NPDES Application for Permit Renewal, Hawaii Permit No. HI 0000329 (July 30, 2010)

Applicable Definitions

Process Waste Water means any water, which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. [40 CFR 401.11(q)]

Runoff means the flow of storm water resulting from precipitation coming into contact with petroleum refinery property. [40 CFR 419.11(b)]

Contaminated Runoff means runoff that comes into contact with any raw material, intermediate product, finished product, by-product or waste product located on petroleum refinery property. [40 CFR 419.11(g)]

Background

Effluent Limitations Guidelines (ELGs) for the Cracking Subcategory of the Petroleum Refining Point Source Category at 40 CFR 419 Subpart B are based, in part, on a discharger's production rate. The Permittee's current average daily production rate is 54,510 barrels per day (bbl/day).

Process Wastewaters. The ELGs include limitations for process wastewaters based on best practicable control technology currently available (BPT), best available technology economically achievable (BAT), and best conventional pollutant control technology (BCT). Specific BPT, BAT, and BCT effluent limitations that apply to the Permittee must

be derived using methods described by the ELGs and take into account such factors as production rate, as well as refinery processes and configuration. The most stringent of BPT, BAT, and BCT limitations apply.

For derivation of BPT, BAT, and BCT limitations for process wastewaters being discharged at Outfall Serial No. 001, size factors and process factors are determined as follows.

Size Factor. At a crude processing rate of 54,510 bbl/day, the appropriate size factor is 1.04, pursuant to the ELGs at 40 CFR 419.22(b)(1) for BPT, at 40 CFR 419.23(b)(1) for BAT, and at 40 CFR 419.24(b)(1) for BCT.

Process Factor. The process configuration for each process is determined by summing the process feedstock rates for each crude, cracking and coking, lube, and asphalt process at the refinery. Each individual feedstock rate is multiplied by the capacity relative to the throughput, and a weight factor specific for each process, to derive a “process configuration,” which in turn is used to determine a “process factor” in accordance with the ELGs at 40 CFR 419.22(b) (2) for BPT, at 40 CFR 419.23(b)(2) for BAT, and at 40 CFR 419.24(b)(2) for BCT.

Derivation of the process configuration for a production rate of 54,510 bbl/day is shown in the following table:

Table 1. Process Configurations for Outfall Serial No. 001

Process	Capacity (x 1,000 bbl/day)	Capacity relative to throughput	Weight Factor	Process Configuration
Crude				
Atmospheric Distillation	54.51	1.0		
Vacuum Distillation	27.87	0.511		
Desalter Feed	54.51	1.0		
Total	136.9	2.511	1	2.511
Cracking				
Fluid Catalytic Cracker	19.29	0.354		
Total	19.29	0.354	6	2.123
Asphalt				
Production	0	0		
Total	0.4	0	12	0
Lube				
	--	--	13	0
Reforming and Alkylation Processes				

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Sulfuric Acid Alkylation	5.22	0.096	0	0
Total	5.22	0.096	0	0
Total Refinery Configuration at 54,510 bbl/day				4.63

The process factors resulting from the total refinery configuration in Table 1, above, is 0.88, as determined in accordance with 40 CFR 419.22(b)(2) for BPT, 40 CFR 419.232(b)(2) for BAT, 40 CFR 419.22(b)(2) for BCT.

A summary of the size and process factors calculated above are shown in Table 2.

Table 2. Process Factors

Size Factor	Process Factor
1.04	0.88

To determine BAT limitations for total and hexavalent chromium and phenolic compounds in process wastewaters, the ELGs require consideration of effluent factors and refinery processes. BAT effluent factors are presented at 40 CFR 419.23(c)(1); the refinery processes considered are the crude, cracking and coking, asphalt, lube, and reforming and alkylation processes, which correspond to those identified within the *Guide for the Application of Effluent Limitations Guidelines for the Petroleum Refining Industry* (page 20).

Determination of Process Wastewater Effluent Limitations at Outfall Serial No. 001

BPT. The following table shows the derivation of process wastewater BPT limitations at a production rate of 54,510 bbl/day.

Table 3. BPT Limitations for Process Wastewaters

Parameter	Preliminary Effluent Limitation Factor ¹ (lbs/1,000 bbls)		Size Factor	Process Factor	Feed Stock Rate (1,000 bbl/day)	Effluent Limitation ² (lbs/day)	
	Average Monthly	Maximum Daily				Average Monthly	Maximum Daily
BOD ₅	5.5	9.9	1.04	0.88	54.51	274	494
TSS	4.4	6.9	1.04	0.88	54.51	220	344
COD ³	38.4	74.0	1.04	0.88	54.51	1,916	3,692
Oil & Grease	1.6	3.0	1.04	0.88	54.51	80	150
Phenols	0.036	0.074	1.04	0.88	54.51	1.8	3.7
Ammonia Nitrogen	3.0	6.6	1.04	0.88	54.51	150	329
Sulfide	0.029	0.065	1.04	0.88	54.51	1.4	3.2
Total Chromium	0.088	0.15	1.04	0.88	54.51	4.4	7.5

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Parameter	Preliminary Effluent Limitation Factor ¹ (lbs/1,000 bbls)		Size Factor	Process Factor	Feed Stock Rate (1,000 bbl/day)	Effluent Limitation ² (lbs/day)	
	Average Monthly	Maximum Daily				Average Monthly	Maximum Daily
Hexavalent Chromium	0.0056	0.012	1.04	0.88	54.51	0.28	0.60
pH	--	--	--	--	--	6.0 – 9.0	

¹ From 40 CFR 419.22(a) (pounds per 1,000 bbls of feedstock)

² Pounds per day (lbs/day)

³ In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD₅. If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable limitations of BOD₅.

BAT. The following table shows the derivation of BAT limitations for process wastewaters at production rates of 54,510 bbl/day.

Table 4. BAT Limitations for Process Wastewater

Parameter	Preliminary Effluent Limitation Factor ¹ (lbs/1,000 bbls)		Size Factor	Process Factor	Feed Stock Rate (1,000 bbl/day)	Effluent Limitation ² (lbs/day)	
	Average Monthly	Maximum Daily				Average Monthly	Maximum Daily
COD ³	38.4	74.0	1.04	0.88	54.51	1,916	3,692
Ammonia Nitrogen	3.0	6.6	1.04	0.88	54.51	150	329
Sulfide	0.029	0.065	1.04	0.88	54.51	1.4	3.2

¹ From 40 CFR 419.22(a) (pounds per 1,000 bbls of feedstock)

² Pounds/day (lbs/day)

³ In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD₅. If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable limitations of BOD₅.

BAT limitations for total and hexavalent chromium and phenolic compounds are based on feedstock rates. Figures used in calculations for this permit are shown in the following table. All units are in 1,000 bbl/day unless otherwise specified.

Table 5. Feedstock Rates for Determining BAT Limitations

Refinery Throughput	54,510 bbl/day
Crude	

Atmospheric Distillation	54.51
Vacuum Distillation	27.87
Desalting	54.51
Total	136.9
Cracking and Coking	
Fluid Catalytic Cracking	19.29
Hydrocracking	--
Hydrotreating	--
Delayed Coking	--
Total	19.29
Lube	
Total	--
Asphalt	
Production	0
Total	0
Reforming and Alkylation	
Catalytic Reforming	5.22
Total	5.22

Based on the total feedstock rates shown above, derivation of BAT limitations for total and hexavalent chromium and phenolic compounds is shown in the following table.

Table 6. BAT Limitations for Process Wastewater (Chromium and Phenols)

Pollutant	Preliminary Effluent Limitations Factor ¹ (lbs/1,000 bbls)		Feedstock Rate (1,000 bbl/day)	Effluent Limitations ² (lbs/day)	
	Average Monthly	Maximum Daily		Average Monthly	Maximum Daily
Phenolic Compounds					
Crude	0.003	0.013	136.9	0.41	1.8
Cracking and Coking	0.036	0.147	19.29	0.69	2.8
Lube	0.090	0.369	0	0	0
Asphalt	0.019	0.079	0	0	0
Reforming and Alkylation	0.032	0.132	5.22	0.17	0.69
Limit (Sum)	--	--	--	1.3	5.3
Total Chromium					
Crude	0.004	0.011	136.9	0.55	1.5
Cracking and Coking	0.041	0.119	19.29	0.79	2.3
Lube	0.104	0.299	0	0	0
Asphalt	0.022	0.064	0	0	0
Reforming and Alkylation	0.037	0.107	5.22	0.19	0.56
Limit (Sum)	--	--	--	1.5	4.4

Pollutant	Preliminary Effluent Limitations Factor ¹ (lbs/1,000 bbls)		Feedstock Rate (1,000 bbl/day)	Effluent Limitations ² (lbs/day)	
	Average Monthly	Maximum Daily		Average Monthly	Maximum Daily
Hexavalent Chromium					
Crude	0.0003	0.0007	136.9	0.041	0.10
Cracking and Coking	0.0034	0.0076	19.29	0.066	0.15
Lube	0.0087	0.0192	0	0	0
Asphalt	0.0019	0.0041	0	0	0
Reforming and Alkylation	0.0031	0.0069	5.22	0.016	0.036
Limit (Sum)	--	--	--	0.12	0.28

¹ From 40 CFR 419.22(a) (pounds per 1,000 bbls of feedstock)

² Pounds per day

BCT. The following table shows the derivation of BCT limitations for process wastewaters at a production rate of 54,510 bbl/day.

Table 7. BCT Limitations for Process Wastewater

Pollutant	Preliminary Effluent Limitations Factor ¹ (lbs/1,000 bbls)		Size Factor	Process Factor	Feed Stock Rate (1,000 bbl/day)	Final Effluent Limitations ² (lbs/day)	
	Average Monthly	Maximum Daily				Average Monthly	Maximum Daily
BOD ₅	5.5	9.9	1.04	0.88	54.51	274	494
TSS	4.4	6.9	1.04	0.88	54.51	220	344
Oil & Grease	1.6	3.0	1.04	0.88	54.51	80	150
pH	--	--	--	--	--	6.0 – 9.0	

¹ From 40 CFR 419.22(a) (pounds per 1,000 bbls of feedstock)

² Pounds per day (lbs/day)

Most Stringent Technology-Based Process Wastewater Effluent Limitations

The following table presents the technology-based process wastewater effluent limitations that apply to the Permittee. The limitations are the most stringent of the BPT, BAT, and BCT limitations required by the ELGs and are expressed in units of pounds per day and based on production rate 54,510 bbl/day.

Table 8. Summary of Applicable Technology-Based Effluent Limitations

Pollutant	Units	Effluent Limitations ¹	
		Average Monthly	Maximum Daily
BOD ₅	lbs/day	274	494
TSS	lbs/day	220	344
TOC ²	lbs/day	603	1,087

Pollutant	Units	Effluent Limitations ¹	
		Average Monthly	Maximum Daily
Oil & Grease	lbs/day	80	150
Phenols	lbs/day	1.3 ³	3.7
Ammonia Nitrogen	lbs/day	150 ³	329 ³
Sulfide	lbs/day	1.4 ³	3.2 ³
Total Chromium	lbs/day	1.5 ³	4.4 ³
Hexavalent Chromium	lbs/day	0.12 ³	0.28 ³
pH	pH Units	6.0 – 9.0	

¹ All technology-based limitations for process wastewaters are based on BPT unless otherwise noted.

² In accordance with regulations in 40 CFR 419, TOC may be substituted as a parameter in lieu of COD Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD₅, and shall be established at a ratio of 2.2 to 1 to the applicable limitations of BOD₅.

³ Based on BAT.

Determination of Discharge Limitation Allocations for Treated Contaminated Runoff

Additional storm water effluent limitation allocations for contaminated runoff commingled with process wastewater are developed from the requirements in 40 CFR 419.22(e)(2), 419.23(f)(2), and 40 CFR 419.24(e)(2). These limitations provide additional load allocations to those effluent limitations established for process wastewaters. If contaminated runoff is commingled with process wastewater, then the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff by the concentrations listed in Table 9.

Table 9. Additional Contaminated Runoff Allocations

Pollutant	Units	Average Monthly	Maximum Daily
BOD	lbs/1,000 gallons of flow	0.22	0.40
TSS		0.18	0.28
TOC ¹		0.484	0.88
Oil and Grease		0.067	0.13
Phenolic Compounds		0.0014	0.0029
Total Chromium		0.0018	0.0050
Hexavalent Chromium		0.00023	0.00052
pH	s.u.	6.0 – 9.0	

¹ In accordance with regulations in 40 CFR 419, TOC may be substituted as a parameter in lieu of COD Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD₅, and shall be established at a ratio of 2.2 to 1 to the applicable limitations of BOD₅.